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AMERICAN aircraft modeler

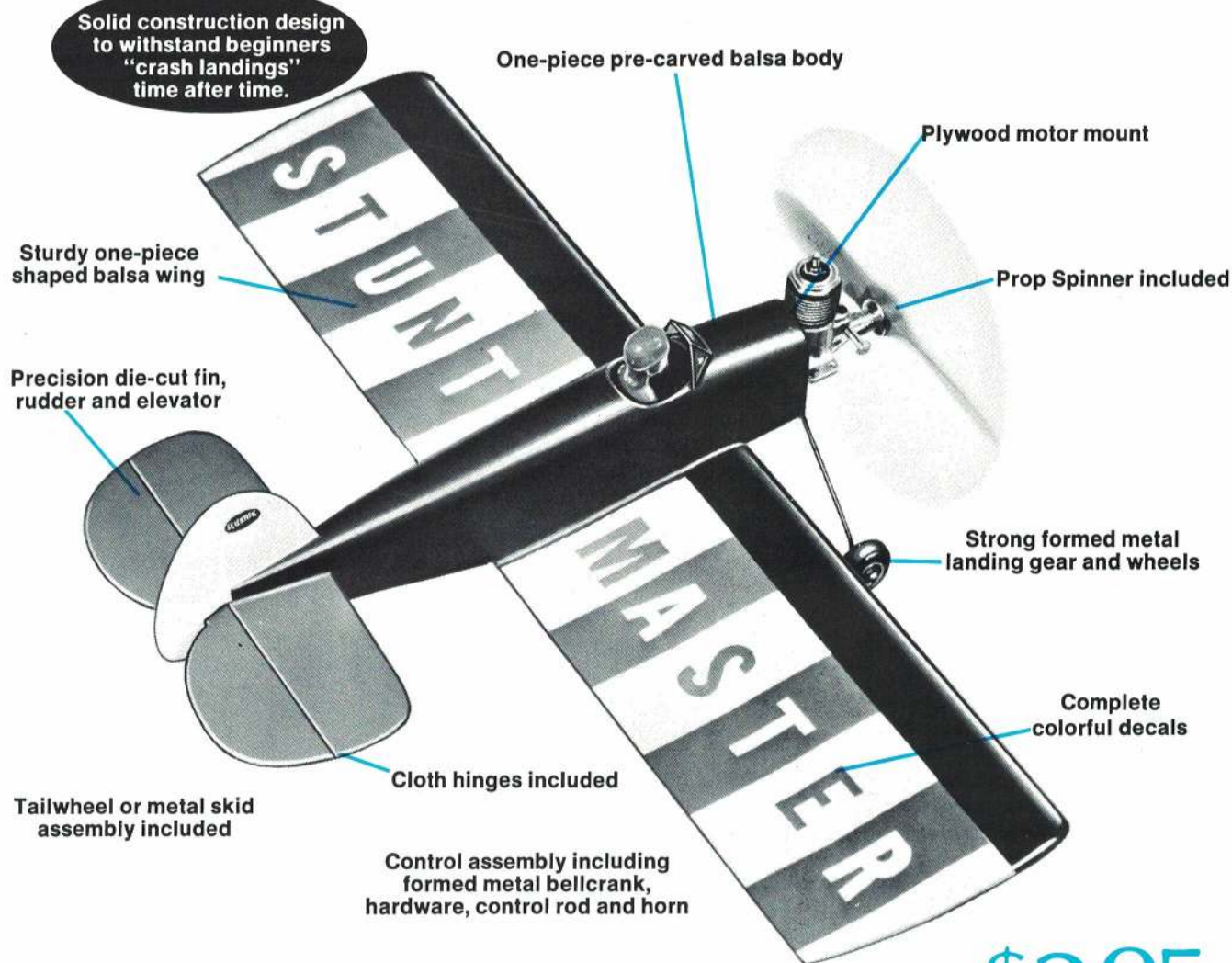
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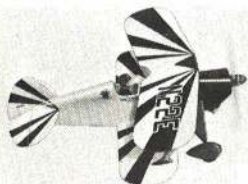
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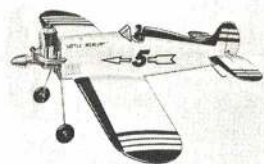


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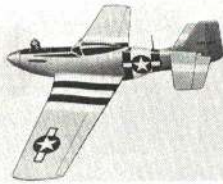
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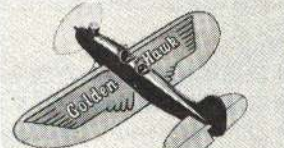
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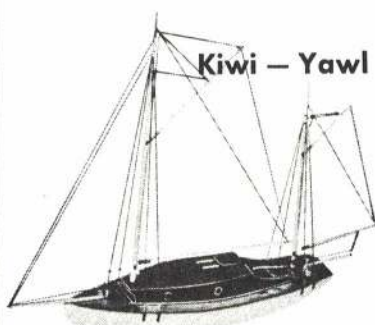


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Cover Photo: Don Botteron's Zlin Akrobat as finished with a paint brush by the method described in article on page 29. Picture by AAM's Art Director Tom Murphy.

WILLIAM J. WINTER — PUBLISHER **EDWARD C. SWEENEY, JR.—EDITOR**
Thomas L. Murphy, Art Director **Joseph R. Wright, Circulation**
Anna Maria Nunez, Editorial Assistant **Anne Fuhrken, Advertising Assistant**

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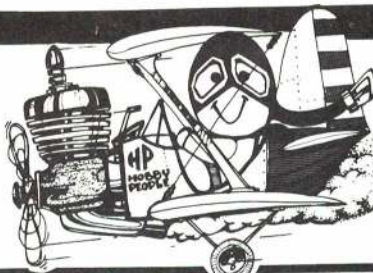
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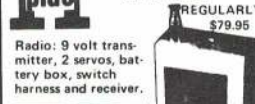
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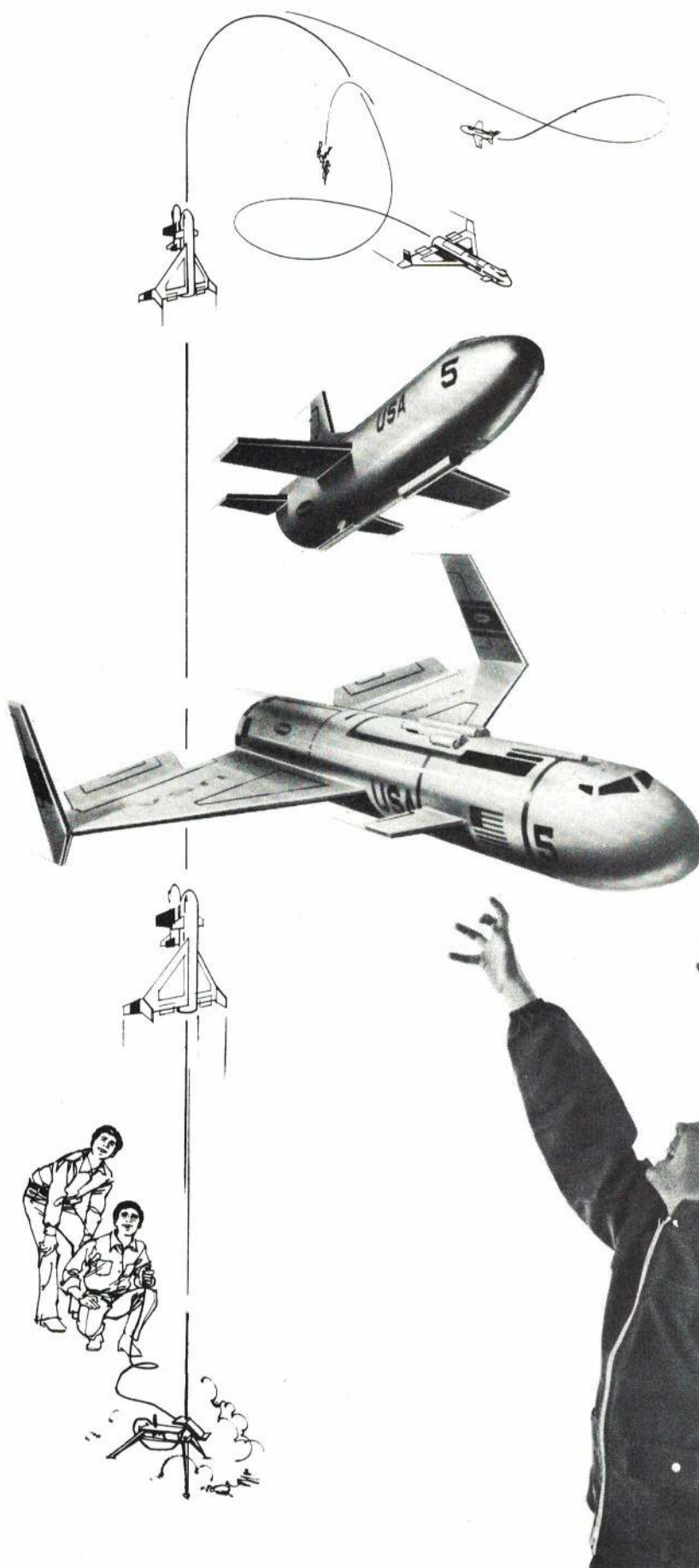
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Bill Hunter

The above information should have been included in the original article; it was omitted by mistake.

—Editor

Jungle models

Even down here in the jungles of Peru, we are enjoying *AAM*. There are several fathers and sons here on our missionary compound with a growing interest in RC. Watching our local topa (balsa) planes disappear over the green gets exasperating.

Through your publication we were introduced to Ace Radio Control, and Mr. Runge has treated us real fine. The very concept of flying the Ace High Power Pod Glider 125 times and still being in possession of it is remarkable! This is new, and to us, great. Our cleared area here is a bit restricted, so I cheat a little by using a Golden Bee and get a three-minute climb, putting the glider almost out of sight. There are not many thermals here, but I've shared the stick with others and we're having a ball.

Now that we're hooked, I'm ordering your *Getting Started in RC* so we can get the cart back behind the horse.

Can you or other readers please recommend a proven, bug-free, dependable, reasonably-priced, restricted area, model/engine/RC combination for us? I know it is a big order, but we are far from parts, service and guarantees. Also, transportation is a real problem. Although our mailing address is Lima, we are located 500 miles east over the Andes down in the Amazon basin.

One of our group is an AMA member and shares the *AAM* with all of us. We enjoy each issue.

Thank you for any suggestions, as well as for a current picture of American modeling.

Parl Bartholomew,
Instituto Linguistico,
Casilla 2432, Lima, Peru, S.A.

Vampire haunt

I got a big kick from your editorial about the workshop ("Straight and Level," April *AAM*). I, too, am dominated by The Cave. One must descend into the bowels of our basement and duck beneath the far-reaching arms of the octopus called furnace. Having braved this terror of any light-loving persons over five feet tall, you have arrived at the mouth of The Cave: dark, damp, smelling bad (from evaporating thinnings) and littered with the bones of prehistoric models. Truly a bonanza for some future archeologist!

Frank Scott, Dayton, Ohio

O.T. Revival

Just thought I would drop a line to commend you for your excellent Old Timer coverage of the past few months. Some of us old yo-yo fanatics and debilitated RC fliers have found welcome relief and a quiet respite in watching the soaring majesty of these old birds.

I finished a Brooklyn Dodger early this year and can attest to its beautiful flight characteristics. To date, it has won two third places and a first place at the local contests. One additional word on trimming and flying might be in order, though. I have found that a 00-00 engine setup gives me a beautiful right-hand power pattern and left-hand glide. Power to glide transition is excellent. A very small amount of wash-in on the in-board wing keeps it up during the power portion of the flight and a weighted drag tab (about an inch wide and three inches long) hinged on the left wing panel at the polyhedral break tightens up the glide pattern.

This drag tab concept works well on most of the Old Timers—tilting the stab has little effect, since most of the O. T.'s stabs were too small to use this way. I am just finishing a Pacific Ace for next year's contest season and am looking for some information from any

of your readers who may have built one many years ago.

Mike O'Bryan, 994 Beacon Rd.,
Rockledge, Fla. 32955

Enduring significance

I noted in the April issue the editorial comments about the passing of Howard McEntee. Among other things, you mentioned that he had designed flying models for *Model Airplane News* in the 1930's—including the Cessna, SE-5 and you thought, a Polish Fighter.

Whether he drew plans for the first and the last of those planes I do not know. I do know that he designed the SE-5, for I have a copy of the plans. In addition, he designed a flying model of the then-most-popular sport plane, the Monocoupe. In my youth, I made several of these, as did my boyhood chum, Peter W. Westburg, who afterward was employed by Douglas Aircraft. He also has had several sets of plans published by *MAN*—a control liner or two, as well as radio controllers.

The notice of recent date about McEntee is of special interest to me, because Westburg and I have been writing recently about our early modeling days. He mentioned that he had kept the Monocoupe plans, which he sent along for me to make copies of.

The Monocoupe by McEntee was the finest rubber powered flyer that I ever made, and I made several others. I expect, soon, to begin making another one for my son, now only seven. This illustrates, in a way, the significance of McEntee's work. Above all, I was delighted to know he was the kind of person your notice recorded him to be. Somehow, I have always thought so, and felt that I knew him, all because of the Monocoupe.

It would be a shame for the present generation to be uninformed about what I have always thought was one of McEntee's more significant contributions—the Monocoupe. I have been in and out of modeling since the early days a number of times, including RC. It has never been possible to become an expert, but it has been tremendously relaxing fun. Someone ought to work over the Monocoupe plans on a larger scale for radio control. If this ever is done, I am sure I will build one of them.

Harold W. Ford, Cincinnati, Ohio



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A few months ago TOP FLITE brought you the R/C Standoff Scale P-51 Mustang and we're happy (and proud, of course) to say it has proven one of the most popular kits in recent years.

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Whither the NCLS?

For several issues prior to the NATS, AAM hinted at the formation of National Control Line Society similar to the NFFS and other specialized societies. Interested control line fliers were urged to write in their support, or lack of it, for the formation of an NCLS.

Since the NATS, there has been little or no mention of it. Has anything been accomplished toward this goal or has NCLS died a sudden death?

We have a new, but active and very enthusiastic, CL club here in Ann Arbor and were looking forward to NCLS. We feel that such a group would give control line fliers a sense of identity—CL may never be King again, but it is still the backbone of the model airplane hobby.

We need the identity and the oneness offered by such an organization. If the concept is still kicking around, let's get it going and get something accomplished soon.

William T. Geertsens Jr.,
Ann Arbor, Mich.

NCLS? Heard nothing new. Try
AMA.

—Publisher

RC trainer models

At a recent New England Radio Controlled Modellers (NERCM) meeting, Harold deBolt presented a most interesting history of radio controlled model airplanes. At one point in his talk he discussed the transition that has occurred from "guided free flights" to the present-day contest models which closely resemble "guided missiles". He went on to say that this design evolution was what we all wanted. In the environment of a NERCM meeting he was very close to right; at least 80 percent of the membership are seasoned RC pilots and most are contestants at heart. The remaining 20 percent represent the Sunday fliers and those who aspire to being excellent RC pilots but lack the time or drive to reach the goal. For this group the "guided missile" is not an appropriate model nor, in most cases, is it wanted.

Since the latter group actually represents the great majority of RC fliers, it appears that it is time to face the issue and do two things: 1) define what we mean by performance in RC models; 2) campaign vigorously to make the authors and kit manufacturers describe RC models using these definitions.

The majority of today's published and kitted RC models are designed by men who have lived with the hobby since the days when all RC models were "powered free flights." Over a considerable period of time these men have been part of both a change in model performance and a change in their own flying capability. With a few notable exceptions such as Ken Willard, these men now design "guided missiles" and airplanes which at first glance are trainers but, in reality, are far from the "guided free flight models" that make ideal first RC models for beginners.

In the early days of RC modeling the worst thing that could occur was a fly-away. Today the reliability of our radios makes this improbable. However, the rate of destruction of beginners' models has increased remarkably because our so-called trainers don't have the capability of flying by themselves. The few that do fly often react at speeds beyond the novice's abilities.

The matter boils down to two classes of model: 1) *Inherently stable models* that will right themselves from any attitude and return to straight-and-level flight once their controls are neutralized; 2) *Stable models* that fly in any direction they are pointed with neutralized controls.

The first class is for the novice and the second for the expert. From here the compromises begin.

Typically, in the novice model, crash resistance must be provided by a strong (heavy) structure or by lightweight construction that doesn't have the momentum to destruct itself. The latter approach allows slow flying speeds to be used to obtain the necessary lift and results in a model which is easy for a novice to fly.

If the novice model is to be used in windy conditions, it must have wind penetration—which is another way of saying it must fly fast without gaining altitude rapidly. Obviously, novice model must sacrifice wind penetration to attain a normal slow flying speed which is geared to novice reaction times. A compromise is afforded in this case through use of elevator trim in the modern RC systems. This cannot be varied too far, however, with high lift airfoils without making the model respond too vigorously to down-elevator commands. Again, the novice pilot must be considered: with a good instructor to apply trim and keep him out of trouble, windy day flying is possible. To be safe, learn to fly on relatively calm days.

Perhaps the ideal trainer has a flat-bottom wing initially and a semi-symmetrical wing which can be substituted after initial training is over. This leads us to definition of the in-between model: the transitional trainer. When maximum inherent stability is no longer necessary and faster flight speed and wind-penetration are desirable, the semi-symmetrical winged model is called for. This type of model can be used to quicken the responses and prepare the maturing RC pilot for the stable contest models used for stunting and racing.

Too often our instructors are hot pilots who consider flying a novice trainer the next thing to watching grass grow or flying kites. It's time we gave full consideration to the novice and started him out on models suited to his flying ability. Notwithstanding the argument that some people can learn to fly quickly using a fully stunnable airplane, most novices require a lot of stick time using a true trainer model. And in many cases the novice will turn into a perfectly normal Sunday flier who will never graduate even to a semi-symmetrical airfoiled aircraft!

George A. Wilson,
Walpole, Mass.

HOBBY LOBBY INTERNATIONAL



Robert "HINGE POINTS"
Pack of 6 Hinge Points .95¢
Pack of 15 Hinge Points \$1.95

NEW! A-Justo-Jig FUSELAGE ADAPTER \$10.00



With this assortment of wing nuts and plastic brackets you can use your present A-Justo-Jig (the kind with the red plastic locators) to jig-build fuselages. This is a much quicker and more accurate assembly technique than the old pin & eyeball method. If you don't have an A-Justo-Jig already, we'll sell you the Jig and the Fuselage Adapter for \$39.95 (list value \$45.00).

NEW! J & N HEAT GUN \$24.95

If you haven't tried Monokote-ing with a heat gun you haven't lived! This heat gun technique speeds up the Monokote-covering process incredibly. It's remarkable to watch a wide area of Monokote (or Solarfilm, Coverite or other shrink-type material) draw up tight as the Heat Gun is passed over it. This J & N Heat Gun has actually been in use by a group of Eastern RCers for quite a while and I suspect (since we just found out about it) that these guys were trying to keep it a secret.



NEW! Sullivan "GOLDEN FOAM" 4" x 12" sheets

Plain	1 side adhesive	2 side adhesive
1/4" thick \$0.60	1/16" thick \$0.45	1/16" thick \$0.65
1/2" thick \$0.75	1/8" thick \$0.55	1/8" thick \$0.75
1" thick \$1.00	1/4" thick \$0.65	

"Golden Foam" is a no rebound, slow recovery cushioning material for receiver, shock-absorbing wing saddles, shock-absorbing servo base mounts, shock-absorbing bulkheads.



NEW! Sullivan FUEL CELL Tanks

CR-4 \$1.75	CRST or CSS-4 \$2.00
CR-6 \$2.00	CRST or CSS-6 \$2.25
CR-8 \$2.00	CRST or CSS-8 \$2.25
CR-10 \$2.25	CRST or CSS-10 \$2.45
CR-12 \$2.25	CRST or CSS-12 \$2.45

These look the same externally as the familiar R, SS and RST type tanks, but they include anti-foaming material and a "Klapper Klunk" which won't double on itself. (Who can resist a "Klapper Klunk"!)

Anyway, this tank has so many attributes that will help you to attain more reliable engine runs that I can only suggest you try one.

NEW! HOBBY LOBBY ILLUSTRATED CATALOG FOR '72

Beginning R/Cers will be interested in the section that tells how to get started and what to buy. And "Old Pro" R/Cers will appreciate having the most complete pictorial listing in RC.

\$2.00



NEW! MARK II Blue Max 4 Channel Digital Proportional Semi-Kit

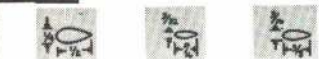


\$179.

Assembled Outfit Shown

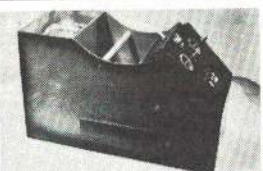
We've been waiting for this! Up until this month the Blue Max Semi Kits had not been the MARK II version. This new MARK II Semi Kit is such an improvement over the previous Blue Max that there's no comparison except in external appearance. While the MARK II Semi Kit will cost you more than the MK. I did we were surprised that the price increase was so minor. The MARK II Semi Kit has a much more "solid" RF section for "glitch-free" long range, and the servos are precise in centering and in fineness of resolution. By building a SEMI KIT version of the MARK II Blue Max you are saving \$40 as compared with buying the assembled version. Since the difficult part of the construction has been done at the factory, all you have to do is the mechanical assembly and hook-up wiring. Don't worry if you don't have any electronic "know-how" — you don't need any. All the electronic parts have been pre-tested and carry the full factory warranty. Outfit includes semi kits for transmitter, receiver-decoder, 4 servos, all ni-cd batteries, charger.

NEW! K & S STREAMLINE TUBING



LARGE MEDIUM SMALL
\$2.40 each \$2.20 each \$1.80 each
35" long aluminum tubing extruded into an airfoil cross section for struts, fairings.

Hobby Lobby ASSEMBLED & FINISHED FIELD BOX \$19.95



Hallco LANDING GEARS



10.3" tread \$3.80
12.8" tread \$4.25
15" tread \$4.75

STARTING BATTERY WET CELL, CHARGER, GLOW PLUG CLIP

SPECIAL!
\$5.99



Hobby Lobby SPECIAL SURGICAL FUEL LINE TUBING 10 feet \$1.99



Midwest CESSNA CARDINAL R-T-F

List Price \$21.95
SPECIAL \$17.97



TRY US OUT... 'Jim Lindsey did:

"I really appreciate your interest and service! You display in reality...through personal action... the kind of service that all of us in RC Modeling dream of..."

Jim Lindsey; WACO, TEXAS

K&B "Super Poxy"



This is the new 2 part epoxy finish that RCM Magazine raved about in the December '71 issue. The line from the RCM product report that ought to turn you on is the one that says: "The (K&B) primer was dry to the touch in 5 minutes."

K&B Super Poxy prices: Thinner, pint \$2.25, 4 oz. colors (red, blue, yellow, orange, black, white) \$1.15 each. 4 oz. catalyst \$1.15. 8 oz. clear \$1.70, 8 oz. primer \$1.70. Color mixing chart — 50¢. 8 oz. catalyst for primer \$1.70

12 Volt FIELD SOLDERING IRON \$2.95



You'd expect to pay over four hundred dollars for such a radio.

- Exceptional Reliability — a unique concept in servo-receiver design
- Extremely long range
- Smallest, lightest servo made
- Servos have closest centering and highest resolution of any servos made
- Lowest Servo cost

- Only 11 1/2 ounce airborne weight
- Full 90 day warranty backed by both the manufacturer, and by Hobby Lobby
- Adjustable tension control sticks
- PRICE: About HALF of what you'd expect to pay for a comparable top quality 5 channel system.

NEW!

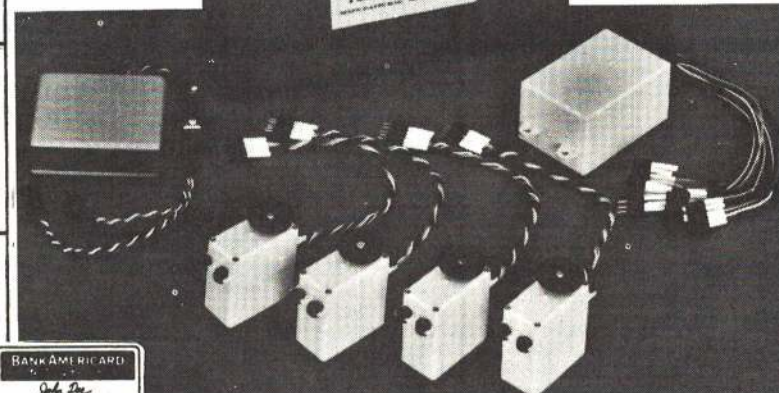
Write or call for FREE "Hobby Lobby 5" Brochure.



HOBBY LOBBY 5 Digital Proportional 27 or 72-75 mhz. \$209.

The 1972 Hobby Lobby 5 Digital Proportional system is an improved version of an already superb radio. While its main

attribute has always been unusual reliability it has other features that make it one of the finest systems that you could choose for competitive contest flying, or just plain "fun" flying. The H/L 5 is a complete 5 channel digital propo. control system with transmitter, receiver, 4 servos, nickel cad batteries for transmitter and receiver and charger.



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DROP YOUR ORDER IN THE MAIL BOX, THEN JUMP BACK BECAUSE WE SHIP FAST!
We pay postage on all orders accompanied by check or money order. Satisfaction guaranteed or money refunded. Phone 615/834-2323 Store hours: 9 a. m. - 5 p. m. except Sundays.

NEW! Universal SCALE WHEELS

These wheels originally came out in 1970 and were discontinued a year or so later to the disappointment of a lot of us. They're back now in fully assembled form and at lower prices. Scale appearance, neutral bounce with variable inflation.

2 1/2" pair \$4.79 3" pair \$5.19 3 1/2" pair \$5.59
2 3/4" pair \$4.99 3 3/4" pair \$5.39 4" pair \$5.79



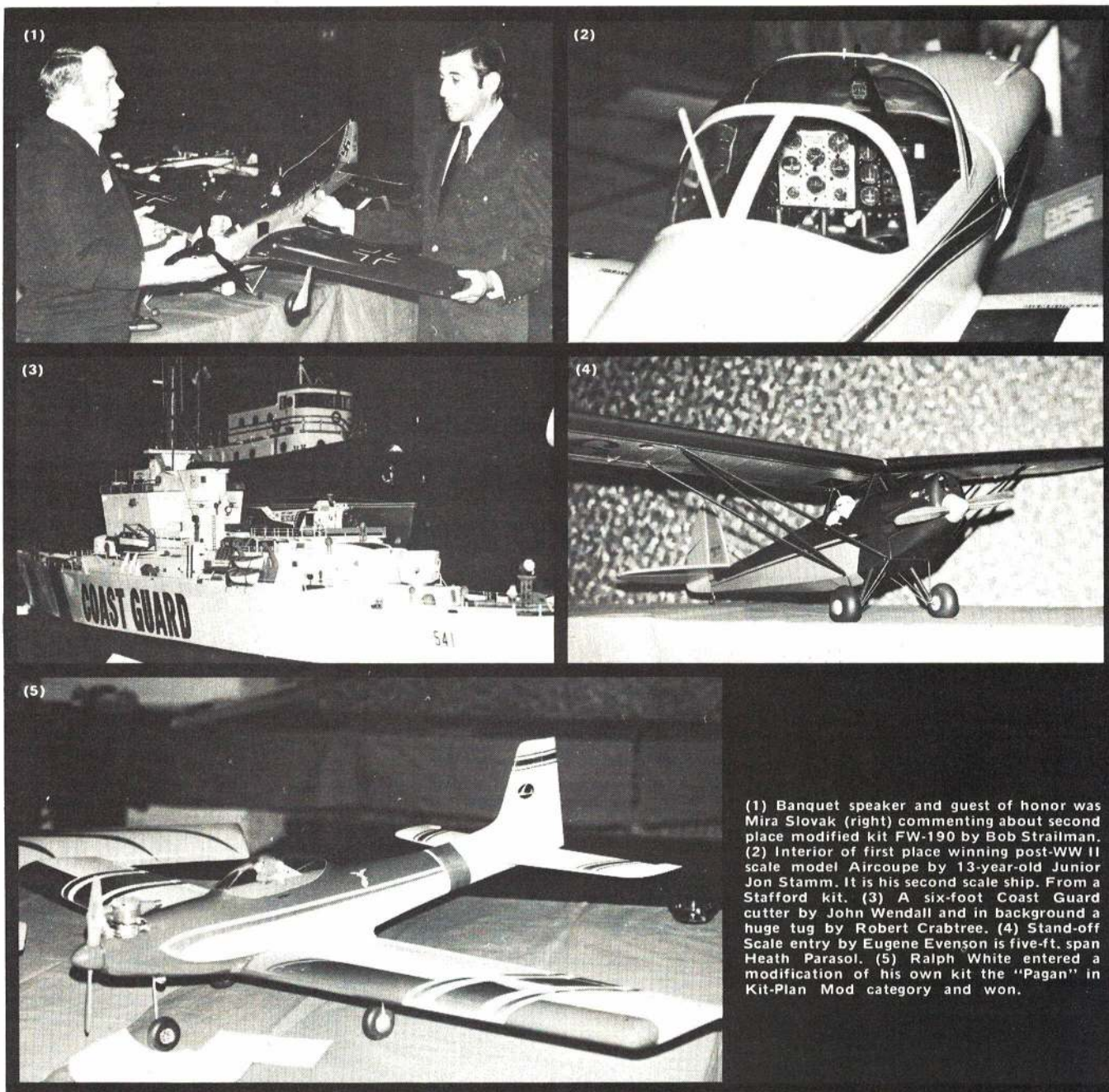
NEW! Hot Line Models BEECHCRAFT

SIERRA TRAINER List Price \$44.95

SPECIAL PRICE \$34.97

A very unusual trainer. Low wing, but stable; will fly well on 3 channels. Very fast construction because the fuselage top and cowl are pre-built fiberglass. A gentle trainer with a .40, but really moves out with a .60. 67" span, 670 sq. inch wing area.





(1) Banquet speaker and guest of honor was Mira Slovak (right) commenting about second place modified kit FW-190 by Bob Strailman. (2) Interior of first place winning post-WW II scale model Aircoque by 13-year-old Junior Jon Stamm. It is his second scale ship. From a Stafford kit. (3) A six-foot Coast Guard cutter by John Wendall and in background a huge tug by Robert Crabtree. (4) Stand-off Scale entry by Eugene Evenson is five-ft. span Heath Parasol. (5) Ralph White entered a modification of his own kit the "Pagan" in Kit-Plan Mod category and won.

SEATTLE RAMS CONFERENCE

by DICK CARSON

ON THE SCENE

For modelers in the great Pacific Northwest the culmination of weeks, months, and in some cases, years of effort is shown the first weekend in February each year. As you pass through the doorway the eyes are assaulted by a fantastic array of wings stretching in every direction of the compass.

Having become accustomed to the scope of the show, the details began to stand out. The boats were fabulous—topped by John Wendall's magnificent Coast Guard cutter. Power boats were characterized by their beautiful finishes as were the cars. Scale plane builders hold no edge to the scale car builders. There were working windshield wipers, operating lights, drivers that "drove" the cars and other details that left the impression the owner had simply sprinkled "wiffle dust" on a full-size one. Unfortunately, Seattle was coping

with an unseasonable amount of snow and no demonstrations were held outdoors as they were last year.

After taking in the car and boat displays, the miniature plane enthusiast was drawn to the myriad of wings of all sizes and shapes stretching the length of the huge room. A decision on how to see everything had to be made. I gave the display a cursory going over, noting where the various categories were, and then went back over them in "slow motion." Each category had its own display table or area, thus models entered in Scale (pre-WW II, WW II and on), Kit or Plan Built, Sport, Kit/Plan Modification, Original Competition, Sailplane, Seaplane, Pylon, New Construction and Novelty were found together. This helps the judging and is a great boon for the photographers.

(Continued on page 68)



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THE BEST ACCESSORIES YOU CAN BUY!

PROVEN IN PERFORMANCE USED BY THE EXPERTS!

NEW! CG RETRACT GEAR

FORGET THE LOW PRICE. When you want dependable retract performance, find out why the leaders use CG Retracts. People like Terry Prather (current FAI record 1:48), Jack Stafford, Nick Zioli, Pete Reed, Garry Korpi, Bud Atkinson, and many others use Carl Goldberg Retracts.



LOWEST PROFILE—Main Gears are only 1" high.
LIGHTEST—Nose Gear, 2 Mains, and 3 Struts, only 6 oz.
BROADEST BASED for best stress distribution.

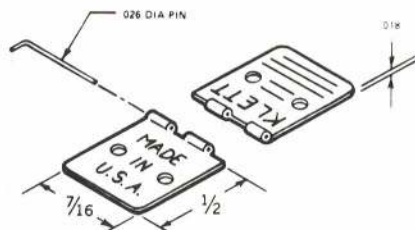
TOUGH—Rugged vibration absorbing nylon moldings. Large bearing surfaces.

SHORTEST TANK COMPARTMENT—Nose Gear needs only 5 1/2" to 6".

SIMPLEST—Main Gear has only 3 molded parts.

EASY—Installation or Strut Removal. Low actuating force—one retract servo can easily actuate all three units.

Pair of Main Gear Retracts—\$ 9.95
Set of Nose Gear & 2 Mains—\$19.95



KLETT NYLON HINGES— THE NEW BREAKTHROUGH

Designed and Manufactured by Roy Klett, Originator of the World-Famous RK Hinges!

An exclusive with Carl Goldberg, here is an extremely strong smaller hinge constructed with exceptional care and attention to detail. So thin that all you need is a knife slit. Top quality, yet only cost \$1.95 for 15 and \$1.10 for 7.

UNIQUE SNAP-LINK! Patent Pending. Now for the first time—you can buy a truly safe link—the SNAP-Link! Note these features:

- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patent Pending!
- One-piece design—no separate pieces that might come apart.
- Proven tough nylon molding—takes tremendous stress, prevents metal electrical noise.
- Self-friction fit on threads—no need of a nut to prevent change of adjustment or vibration wear on threads.

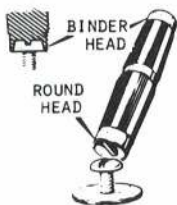


When you want a **SAFE** link . . . ask for **SNAP-LINK!**
Snap-Link, Regular, with rod } 29¢ each
Mini-Snap-Link, with rod }
Snap-Link or Mini-Snap, less rod } 2 for 40¢



STEERABLE NOSE GEAR

Versatile—steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel—won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat. Complete steerable nose gear with nylon bearing, 3/32" plated music wire strut, extra collar, blind nuts, screws and washers—\$2.50.



NOW from Roy Klett the NEW **KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD—CAN'T SLIP OFF AND DAMAGE YOUR WING!**

One end takes Round Head Screws, other end takes Binder Head.

KLETT SAFETY DRIVER
Large for 1/4" Nylon Screws } 98¢ each.
Small for #10 Nylon Screws }



NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.

R/C Fittings Set No. 1 for ship with standard ailerons—\$3.50

R/C Fittings Set No. 2 for ship with strip ailerons—\$3.50

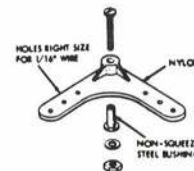
NYLON BEARING

One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers—75¢.

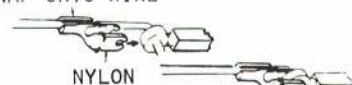


CONTROL HORNS

Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 3/4" wire; nut plate for simplest mounting. Long horns or short horns, with screws—50¢ for 2.



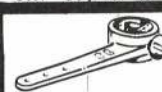
SNAP ONTO WIRE



SNAP OVER END

SNAP'R KEEPER

Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/4 to 3/8" diameter—50¢ for 4.



NYLON STEERING ARM
Hardened steel collar and screw—75¢.

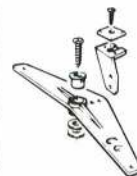


REPLACEMENT FOAM WINGS, ETC.

To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly—\$3.95. Stab and vertical fin, set \$1.95. Assembled Ranger 42 fuselage, plus bearers, nose gear, etc., \$8.95.

NYLON REINFORCING TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2 1/2" wide x 5 ft.—50¢. 3/4" wide x 5 ft.—25¢.



1/2A BELLCRANK and HORN

Made of nylon, this new set provides smooth 1/2A control line operation. Easy on dacron lines, too—25¢.



SHEET METAL SCREWS

Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 3/8—30¢ for 10; #4 x 3/8—30¢ for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 35¢ per item (75¢ outside U.S.). Minimum order \$1.

MANUFACTURERS—All our accessories are available at excellent O.E.M. bulk prices.

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I am sending 20¢ for 8 pg. Illustrated Catalog with, "Recommendations in Starting in R/C," Basic Explanation of R/C Equipment and Radio Control Definitions.

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by JIM McNERNEY
and JOE MOLTZ

SPACE COMMANDER G-45 IN THE J & J INDUSTRIES 'J-CRAFT'

The G45 Space Commander is a four channel digital proportional radio manufactured by Micro-Electronics, Inc. of Japan and marketed by Polk's, 314 Fifth Ave., N.Y., N.Y. Service in the United States is provided by Engineering Enterprises, 159 Fredericks Place, Bergenfield, N.J. 07621. Additional service centers are available in California and the midwest.

The system includes transmitter, receiver, battery pack, switch harness, four servos and mounting trays. The electronic design is similar to digital system design of the last four or five years. Discrete components (i.e., resistors, capacitors, transistors, etc., instead of integrated circuits) were used

throughout the transmitter and receiver. The servo amplifier contains an IC together with some discrete components. The frequency is marked on the transmitter case along with a "channel" number. Thus, channel 5 is 27.195 MHz. The crystals have no frequency information, but are stamped CH-5T for transmitter and CH-5R for receiver. Transistors, except for the transmitter output transistor, are identified by part numbers.

Transmitter: The transmitter "innards" are easily accessible by loosening a single large screw on the back of the case and removing the case backing. A word of caution—don't ever charge the system with the back cover removed!

There is no safety interlock and 110V AC is exposed at the rear of the transmitter plug. For that matter, there aren't many good reasons why you'd want to get inside your transmitter in any case. Leave that to the technician. For the technician, there are the standard pot adjustments for pulse spacing and trim pots to adjust pulse width. Tuning is accomplished by means of variable inductances in the oscillator, final and antenna coupling stages. The output meter is a relative indication of transmitter battery voltage only—not RF output. The charger is internal to the transmitter and consists of a dropping resistor, diode and neon bulb with load resistor. There is no isolation transformer. The stick assemblies are two-axis closed face units with nylon gimbals. The trim levers rotate the pots which are held to the gimbals by set screws. Trim levers provide approximately 30% of full servo throw.

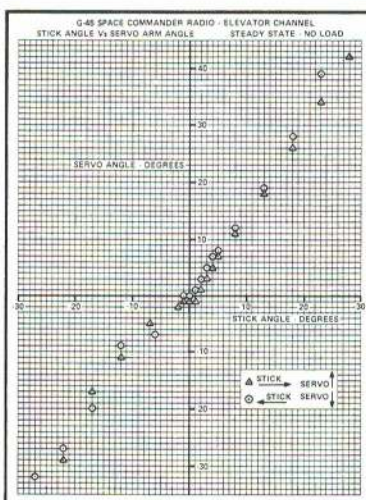
Receiver: Both the RF and logic are contained on a single board. The RF section has a double tuned front end with three stages of IF, diode detector and AF amplifier. The logic utilizes a trigger generator and pulse omission detector to operate four counters, each providing a control pulse.

Servo: The servo amplifiers are completely potted—with leads protruding for power, signal, feedback pot and motor. These are essentially a "throw-away" unit. That is, in case of electronic failure, such as a blown output transistor, the entire amplifier and wire harness must be replaced. Also, if leads become damaged in a crash, they must be spliced, or the entire unit must be replaced. Service on the unit is limited to replacement of components of the mechanics, the motor, pot, or amplifier unit. The plugs are directly interchangeable with the Brunner plugs used in the Kraft Gold Medal Series radios. The servo gears, except for the output gear, the servo case tops and bottoms are interchangeable with Kraft KPS-10 case sections. The center section differs slightly, with different mounting lug length and modification to accept the smaller motor and a carbon pot. Servo centering can be accomplished by removing and re-setting the output gear on the splined shaft of the potentiometer.

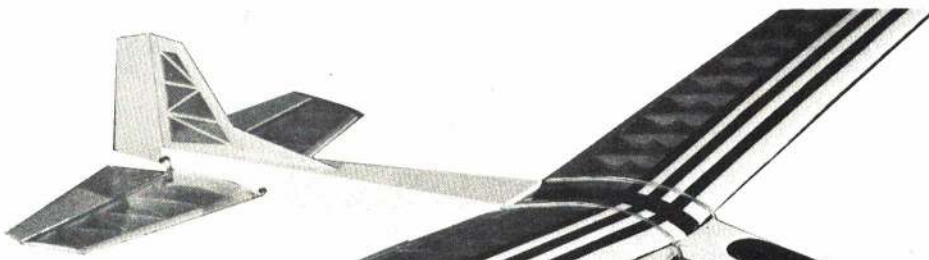


Builder, with the plane, is Joe Moltz. A novice flyer, he's the plane's first student.

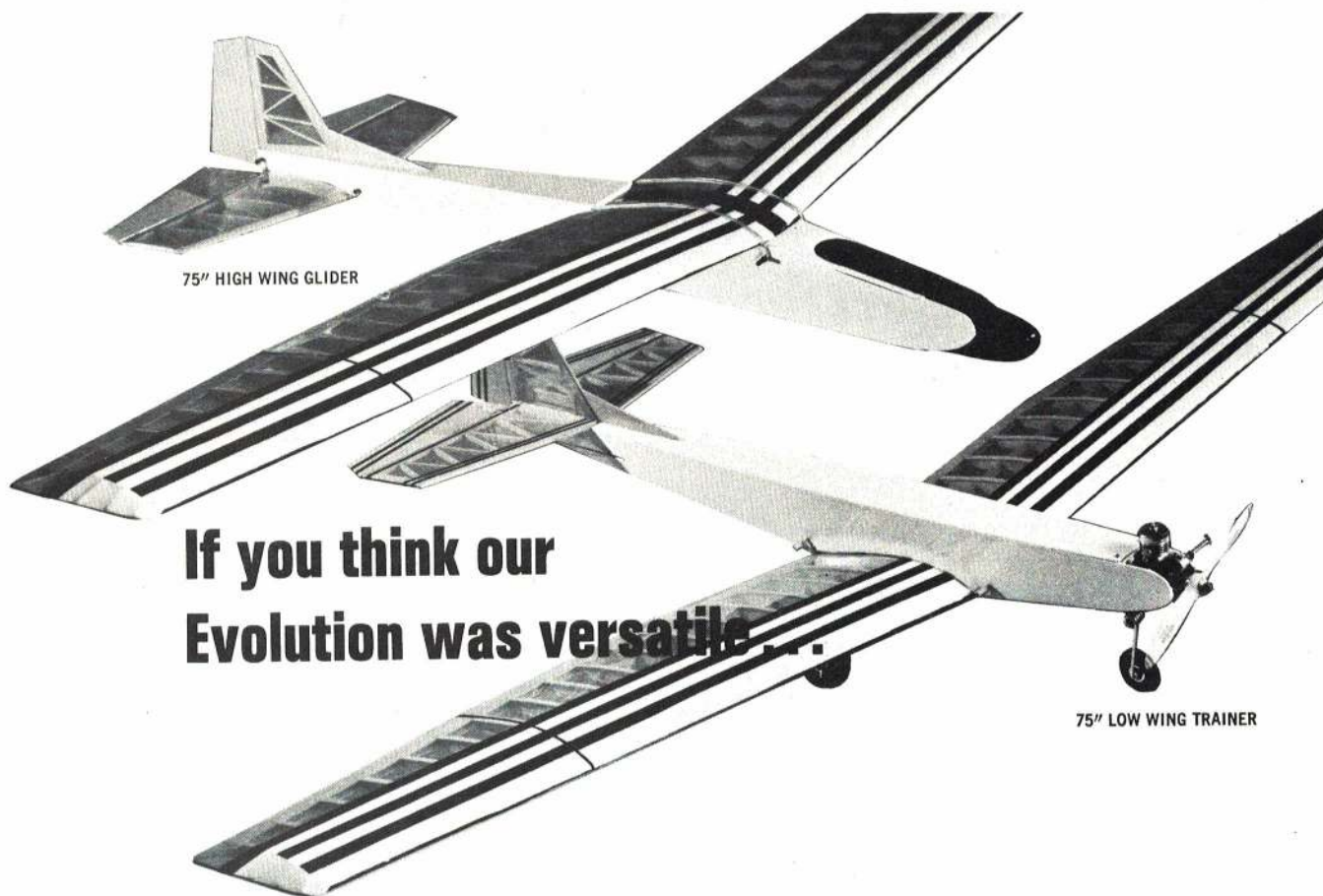
All-discrete component receiver wired to familiar Brunner-type plug block.



(Continued on page 94)



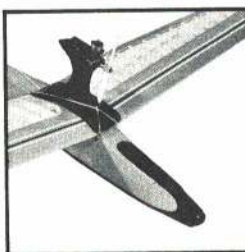
75" HIGH WING GLIDER



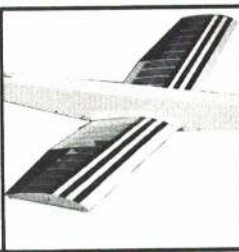
75" LOW WING TRAINER

**If you think our
Evolution was versatile...**

Check our new Hi Lo Evolution!



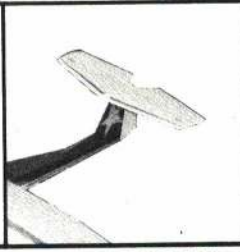
75" HI WING ENGINE POD



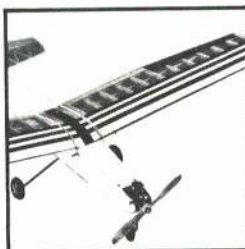
48" LOW WING AILERONS



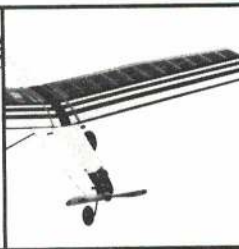
48" LOW WING NO AILERONS



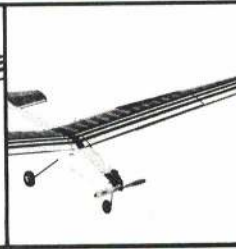
75" HIGH WING T-TAIL



48" HI WING AILERONS



48" HI WING NO AILERONS



75" HI WING AILERONS



75" HI WING NO AILERONS

the New Dumas Hi Lo Evolution is RC's most practical fun airplane . . . it's really many planes in one kit! Build it as a high wing or low wing . . . with a standard or T-tail . . . with or without ailerons . . . and that's just for starters. It's slow, stable and safe for your first RC flight using the 75" wing, an .09 engine and tricycle landing gear. It's a good maneuverable sport plane when you unplug the wing tip panels and bolt in a .15 or .19 engine. Like soaring? . . . just slip in the nose piece, plug in the wing tip panels, remove the landing gear and go

. . . with or without a wing mounted engine pod. Why build three or more planes when you can build just one Hi Lo Evolution . . . Kit RC-11, only \$22.95.

If your dealer can't supply, order from Dumas. Add 10% for postage and handling.

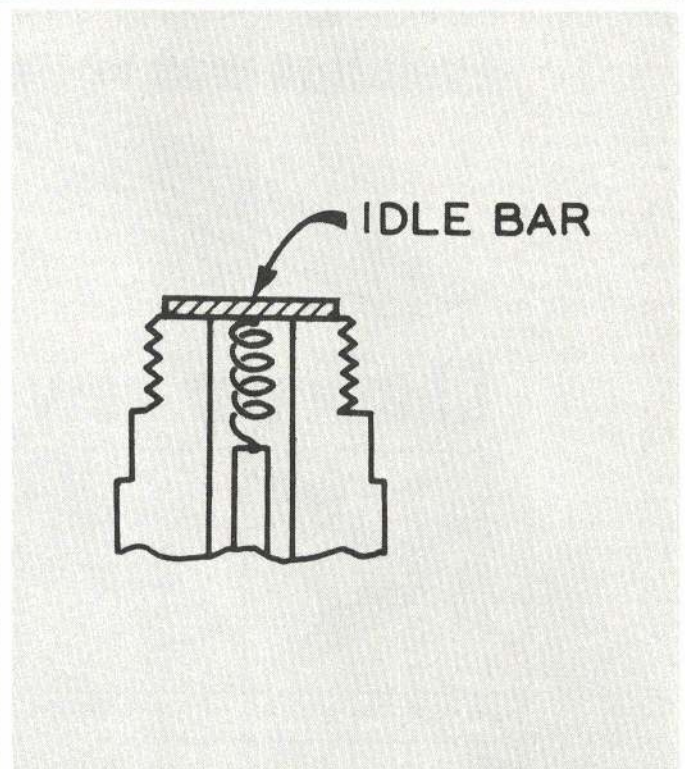
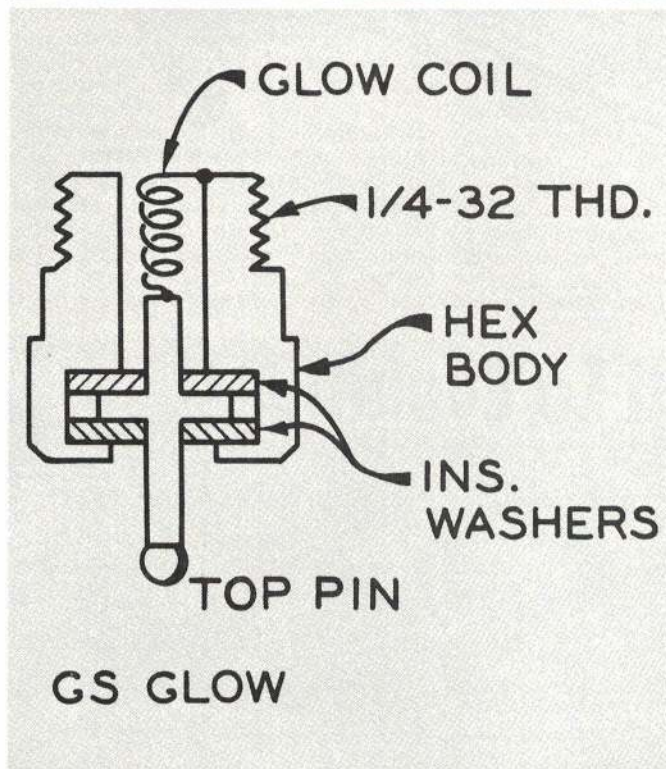
Dumas Products, Inc.
790 South Park Avenue, Tucson, Arizona 85719

dumas
planes

getting started in RC

GLOW PLUGS: CHOICE AND CARE

by HOWARD McENTEE



The glow plug is a rather insignificant but absolutely vital part of a glow engine. It is taken for granted by many modelers, especially the less experienced, but this can lead to problems of hard starting, erratic idling, and other woes.

For the uninitiated let's go over a few of the facts regarding glow plugs. First, there are two main types—long and short—which very definitely are *not* interchangeable. A long plug in an engine designed for a short type can cause disaster, and vice-versa, a short plug in an engine designed for the longer type can cause loss of power and other problems. Since the threads are the same on both types of plugs (1/4-32) the substitution is all too easy. Generally the short plugs are used only in smaller engines.

There is one more type of glow plug you will come across which is built right into the engine cylinder head. All Cox engines are made this way, as are a few 049 engines of other manufacturers. A replacement cylinder head of this type costs just about the same as the standard glow plug. Generally the bottom edge of the glow plug should be even with the underside of the cylinder head. When applying or removing a glow plug, *never* utilize a pair of gas pipe pliers—these not only chew up the plug body so a normal plug wrench cannot be used, but they also give enough leverage to strip the threads in the cylinder head. Every hobby shop carries glow plug wrenches made exactly for this particular job. Some of them also have multiple ends among which is a size that fits the propeller nut. Such a wrench

should be one of the beginner's first purchases. On any engine equipped with a throttle you will probably find a glow plug which has on its extreme inner end what is known as an "idle bar"—a bar running across the entire bottom of the plug. It is usually applied separately, although some manufacturers have developed designs in which the idle bar prevents drops of unevaporated fuel mixture (which can be quite common at slow engine speeds) from reaching the glowing plug coil and, in effect, "putting out the fire." Just as with plain plugs, idle-bar plugs are produced by many manufacturers, with most makers offering both types. An idle-bar plug of the correct length will usually work as well in a non-throttled engine as a standard plug, but not vice-versa.

(Continued on page 67)



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Falcon 56 shown

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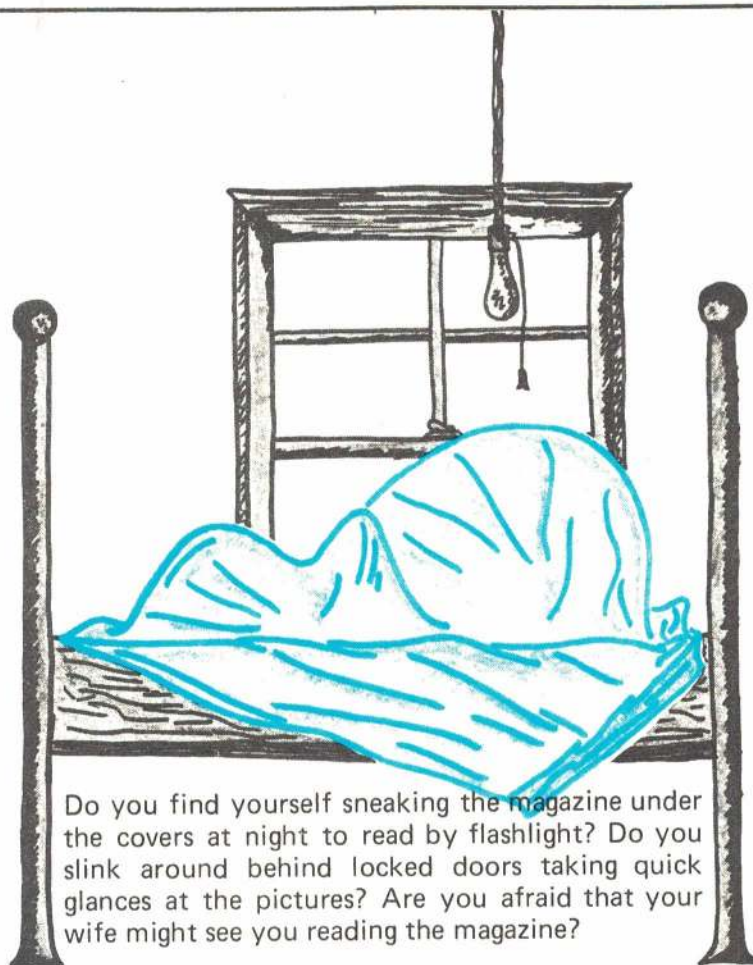
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SO-LONG

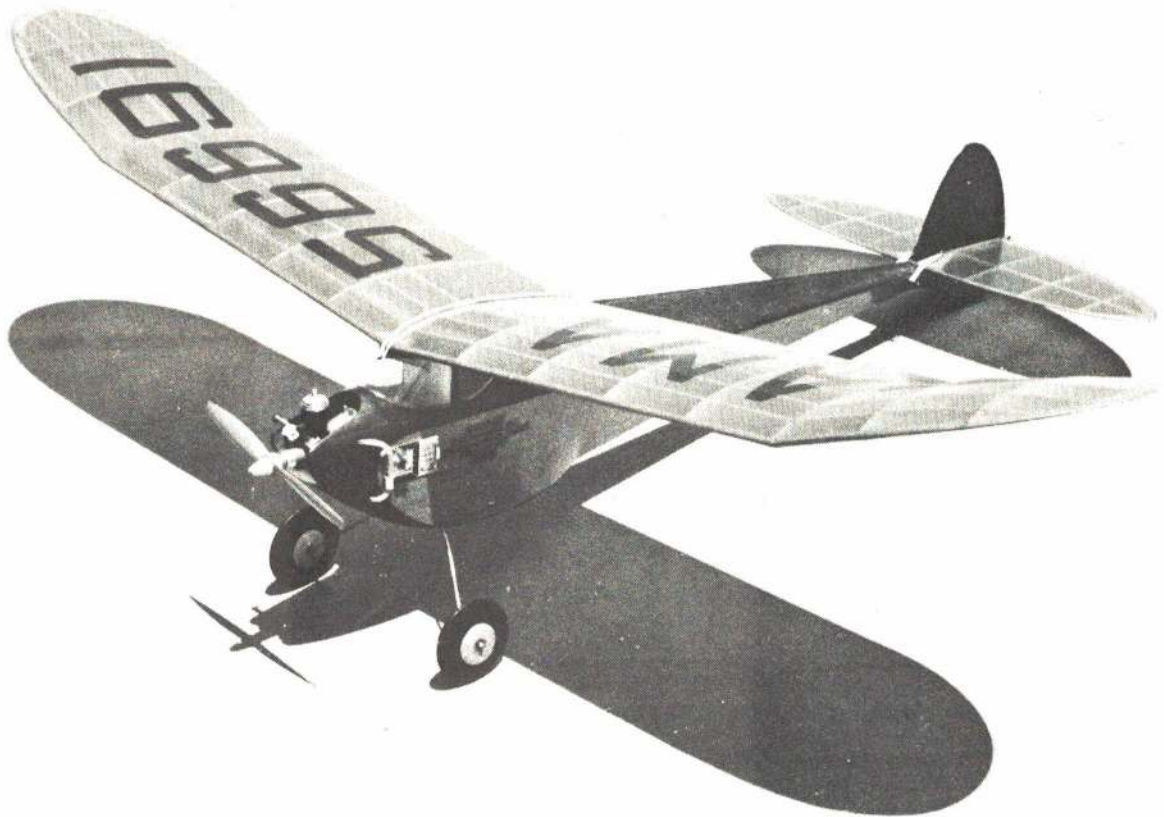
From out of the past came the thundering hoof beats of the great horse Silver and the hearty cry "Hi-yo Silver, awaaay." The Lone Ranger rides again. If you remember that coming out of your radio (that's right, no picture tube), then you just might remember Bill Englehardt's 1940 Class B Nationals winner, So-Long. With a screaming Ohlsson 23 up front it made three consecutive OOS flights and was the class of the field. Its descendant, presented here in miniature, has proven to be a worthy successor even if it did take thirty years to make the scene. In three contests to date it has two first places and one second place to its credit. One of those first places was at the Old-Timer Championships in June 1970 where it put in three consecutive five minute maxes and a six minute fourth flight for a four flight total of 21 minutes. It may not

chase the FAI ships off the field, but it "ain't" bad for a country boy.

I can't recall how the scaled down old-timers got their start, but happily they did and they afford a lot of fun. Their cost is low and there's no need to go hunting around for old ignition engines, coils, condensers, etc. in order to put an old-timer in the air. It has been a pleasant development to see the younger modelers take a liking to these little ships. It demonstrates their wide appeal, and practically speaking, it provides strong young shoulders to help us ancients (30s, 40s, and 50s don't ya know) get started across the field when the thermals blow in.

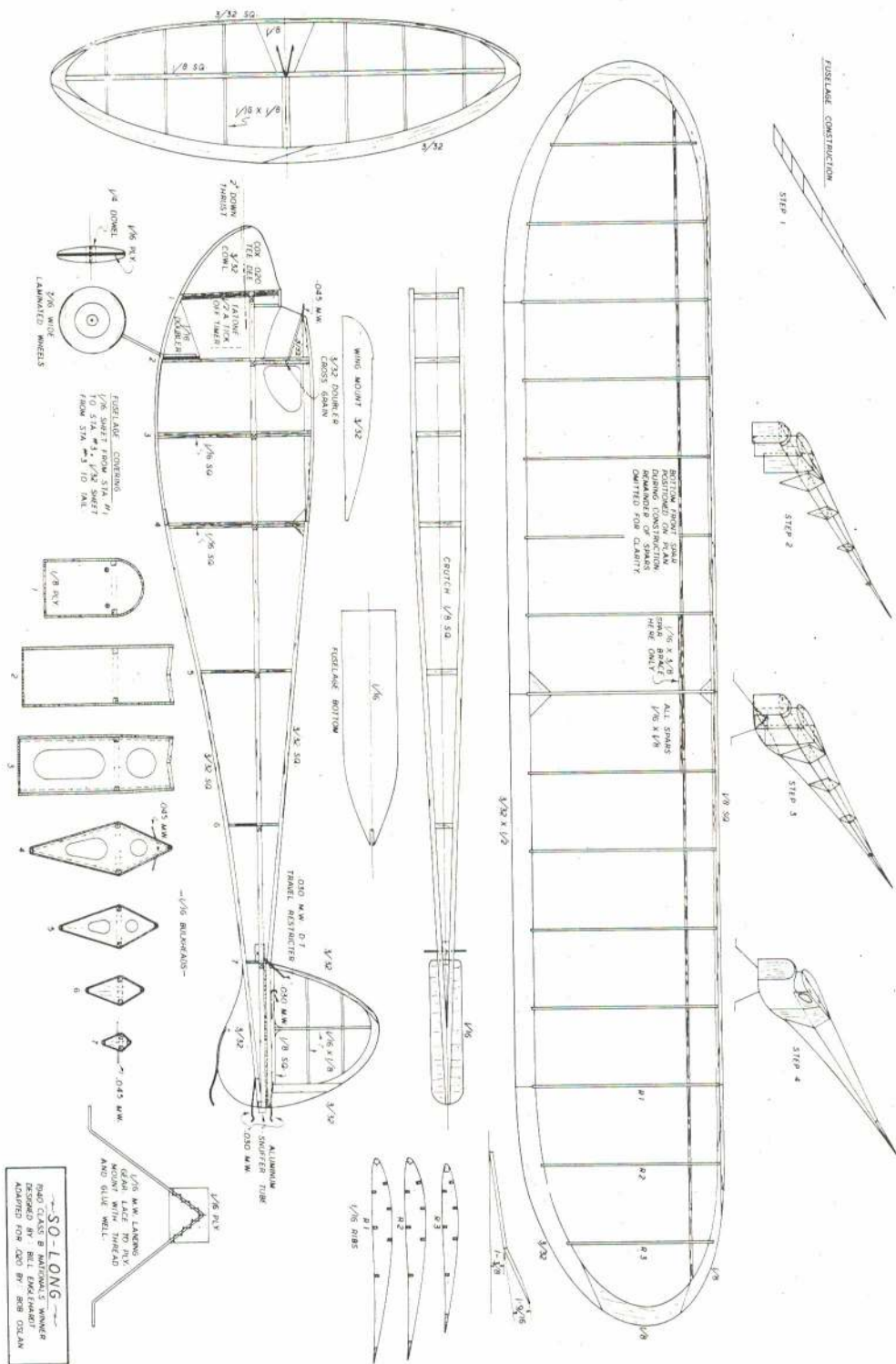
So much for background, clear off the table and let's get started sticking this thing together.

(Continued on page 72)



AN O20-POWERED MINI-OLD TIMER. FLIES GREAT AND HAS A DEFINITE PERSONALITY. ORIGINAL DATES BACK TO 1940.

by ROBERT OSLAN



Arado-234

"The Arado-234 is a fast, maneuverable light bomber or reconnaissance airplane with many desirable features." Had the German high command been as clear-thinking as the post-war American test pilot who made that comment, this sleek jet might have been more than a fascinating annoyance.

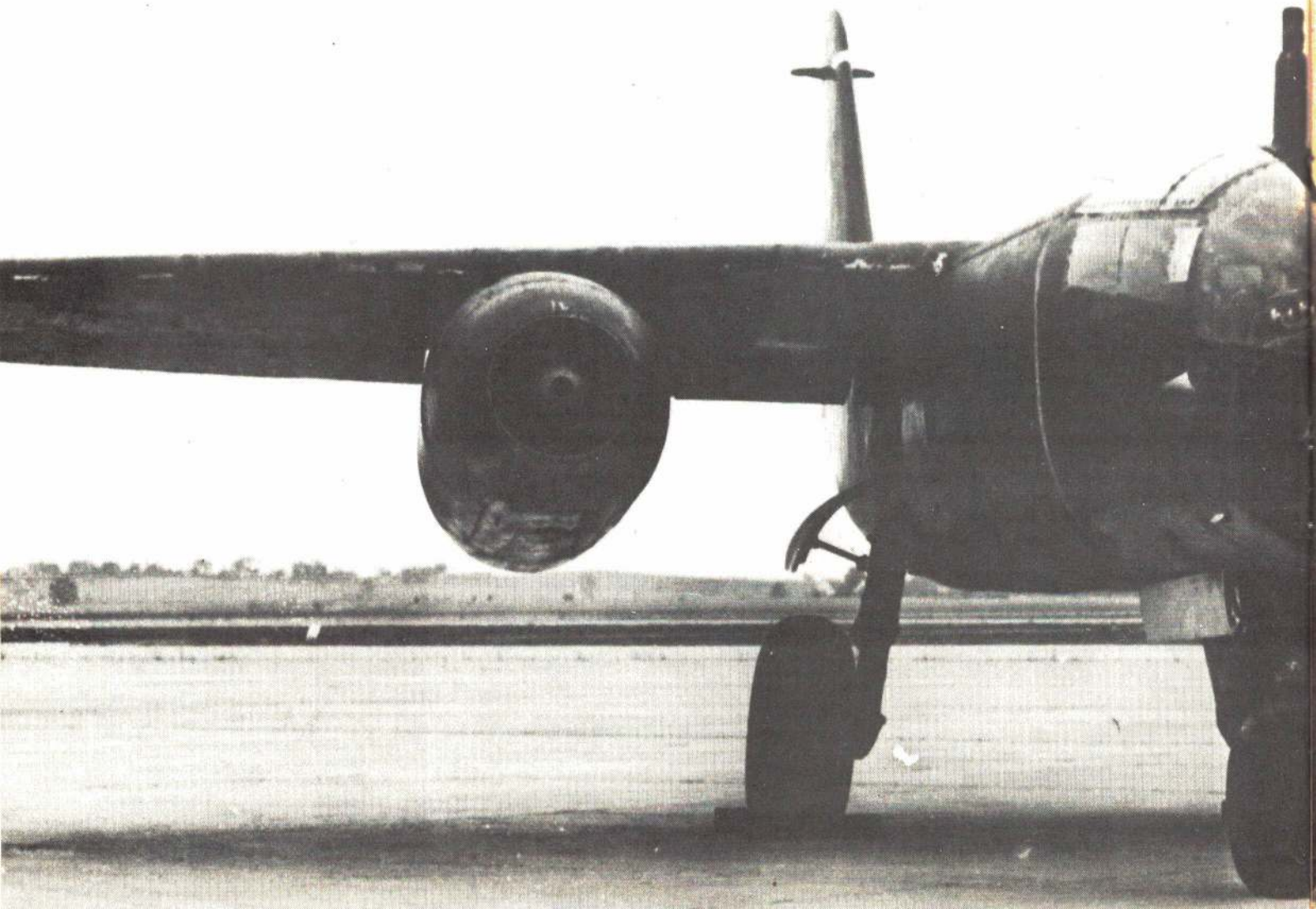
But Germany, in the latter stages of World War II, was showing the effects of long-term corruption and bull-headedness. And so the Ar-234 "Blitz" became just another one of many technically clever projects which was severely hampered by the inability of the German leaders to behave rationally. Ponderous red tape and sudden changes of policy kept a fine airplane bogged down until it was too late to be of any real importance.

The original design was laid down barely a year after the war started—in late 1940. While the U.S. and Great Britain were trying to improve the performance of their outclassed fighter-planes, Germany was preparing to build a variety of jets based on the pioneering experiments by Heinkel in 1930 and early 1940. The Nazis had a big lead and

were planning to make use of it.

Construction of the first Ar-234 began in the spring of 1941, when the U.S. was still thinking in terms of P-39 Airacobras and P-40 Warhawks. About the time America was dragged into the war by the attack on Pearl Harbor, the first two Ar-234's were complete except for engines. And then the lead began to dwindle away. Development and production problems at the Junkers jet engine works were not overcome until February 1943, when the first engines for the Ar-234 arrived, permitting an initial test flight of the Ar-234V-1 in June—more than eight months after the Bell P-59 Airacomet had flown, and two months after the Gloster Meteor.

While the first American and British jets were pretty straightforward, the Arado was loaded with new ideas. In order to achieve a super-clean fuselage design, they chose a nose shape like the later B-29, with all the plexiglass completely faired in—but this ruined rearwards visibility, and so a backwards-facing periscope was developed for the pilot. To keep the fuselage as slim and fast as possible, the designers eliminated



the normal retracting landing gear in favor of a takeoff dolly and retractable landing skids. This gave considerable extra room for much needed fuel, but created a great problem of awkwardness on the ground after landing, as the plane simply could not be taxied on its skids and was a sitting duck for fighter attacks. The first eight test models (V-1 through V-8) were built with dolly gear, and two of them were used briefly by the first operational squadron, but the idea was soon dropped.

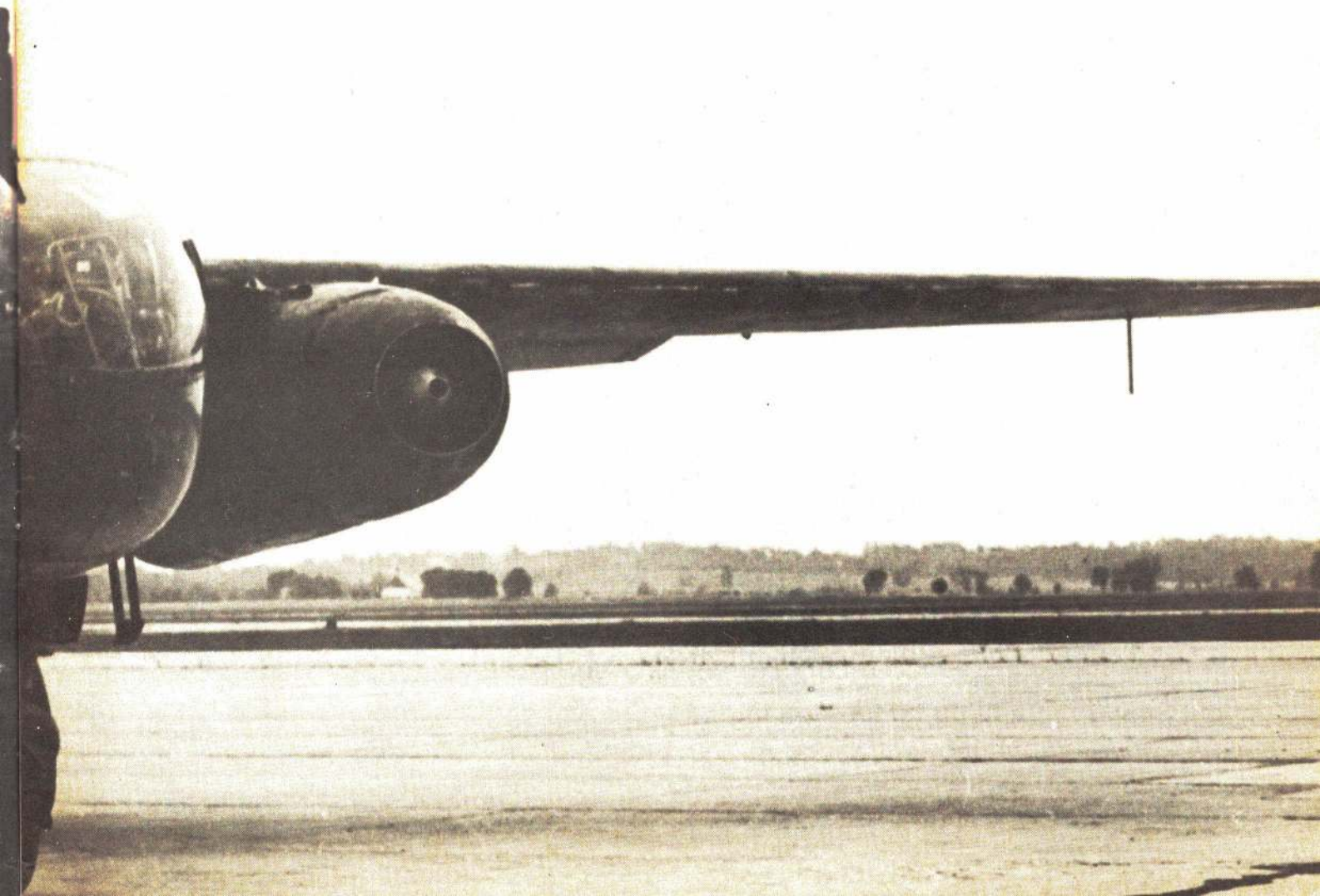
The Ar-234A was to have been a wheelless fighter/bomber/recco airplane, but was never placed in production because of the landing gear problems. Development of the airplane was thus slowed even more, and it wasn't until July 1944 that the first ones got into action. The Ar-234V-5 and Ar-234V-7 flew a number of missions from a base northeast of Paris before being retired. The first prototype of the Ar-234B had already been flown in March 1944, and was followed by other wheel-equipped test planes in quick succession.

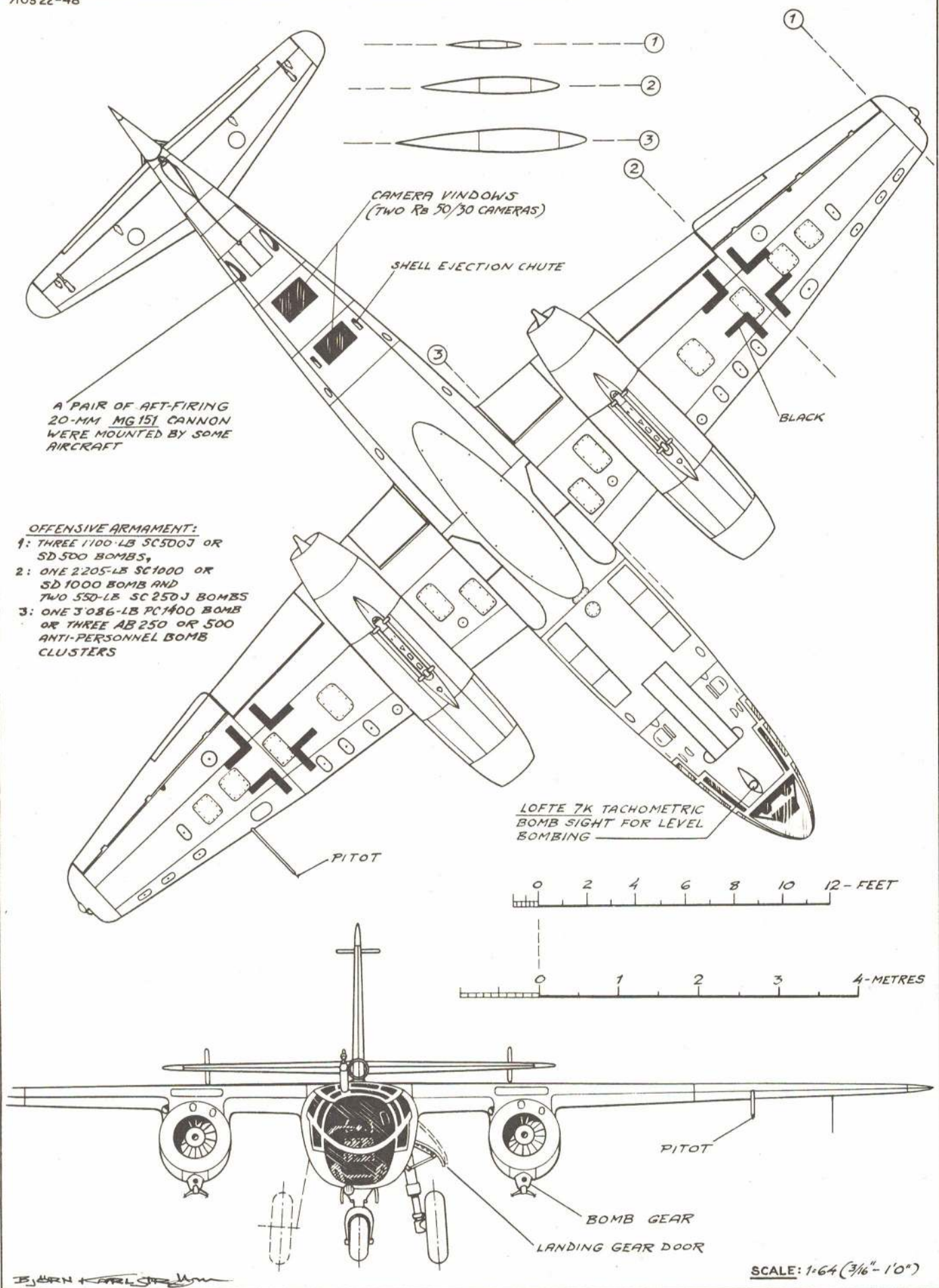
(Continued on page 75)

by DON BERLINER



Photos by the Smithsonian Institution





POWER PLANTS:

TWO JUNKERS JUMO 004B "ORKAN"
AXIAL-FLOW TURBOJETS, EACH
RATED AT 1,980-LB S.T.

WHITE

BLACK
(THIN LINE)

BRAKE
CHUTE
WIRE

RED
WHITE

LOOP ANTENNA

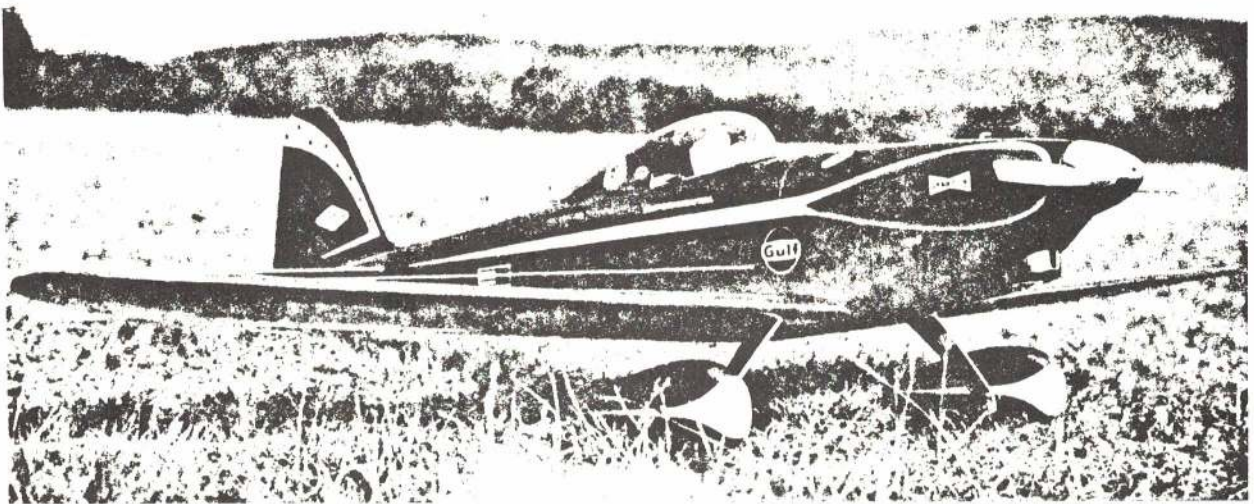
PV1B SIGHTING HEAD OF THE
RF2C PERISCOPE WHICH WAS
NORMALLY USED IN CONJUNCTION
WITH THE BZA 1 BOMBING COM-
PUTER COULD
BE TURNED TO
PROVIDE REAR-
WARD VISION FOR
FIRING THE
CANNONS

RETRACTABLE
FOOT-STEP

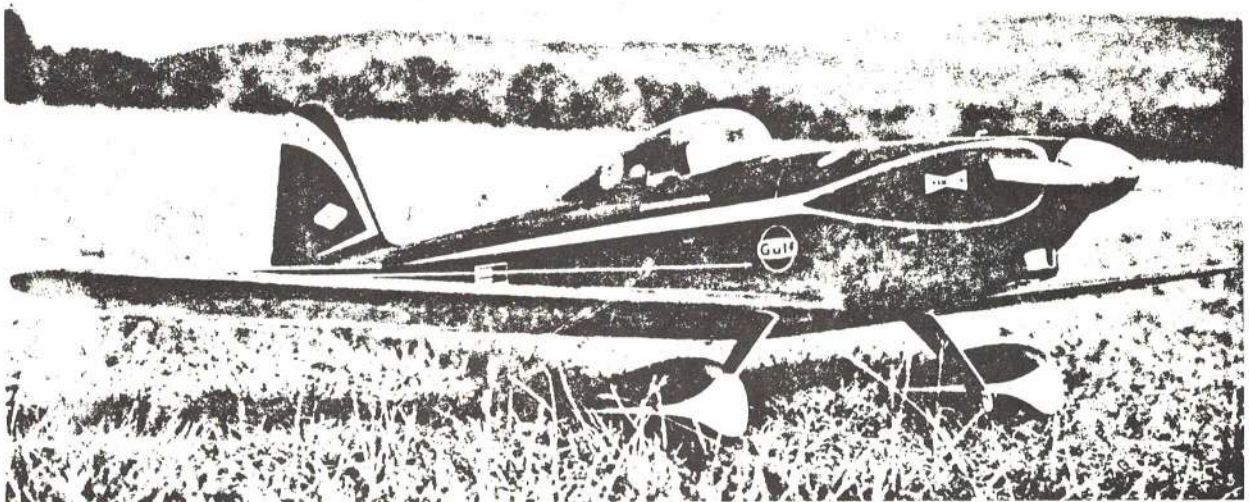
COLOR SCHEME:

FUSELAGE LIGHT GREYBLUE MOTTLED WITH
DARK GREY. (HELLGRAU 76, DUNKELGRAU 74)
WINGS AND STABILIZER SPLINTER CAMOU-
FLAGED IN FORREST GREEN AND DARK
GREEN (SCHWARZGRÜN 70, AND DUNKELGRÜN 71)
ALL UNDER SIDES LIGHT BLUE (HELLBLAU 65).

ARADO AR234B-2 1945



Denight Special



deBOLT HAS BEEN WINNING PYLON RACES FOR SEVERAL YEARS WITH THIS DESIGN. ITS UNIQUE FEATURES ARE WELL DESCRIBED IN THE TEXT.

by HAROLD deBOLT

The Denight Special is the third in a series of Goodyear racer designs. You would think that it represents the experience gained from the previous two, which were more or less successful, depending on whom you talk with. The main problem with it is that it appears to be *no faster* than the No. 1 design, just as No. 2 was no faster either! When you are racing, no increase in speed would seem equivalent to no progress. However, in this case a little tempering is in order. No. 1 design turned race times which are just now being seen by other models. What has No. 3 got going for it that No. 1 did not have? First of all, No. 1 is no longer legal—it fell under the "prototype category." Thus, No. 3 is as close as we can come to the first one and still be legal. It is also improved and a much more usable model, especially as far as maintenance is concerned.

With the Denight the big effort was



Shown are several unique features: Tank is grommet mounted, engine inverted and fully enclosed, air ducting through cowl to carb, and the removeable engine pod itself.

Close up of the engine pod proves a point—it is serviceable.

to make it "more scale" than any other Formula 1 design. You need the handicap in your favor to win today. The main problem is obtaining *accurate* drawings of the original airplane. Frankly, most of the drawings available vary as greatly as the draftsmen who drew them. One racer which was built in this area serves as an example; luckily, the builder is still around and had the original paperwork from which he built the airplane. But how do you come up with drawings to build a model from, when all he used were some dimensions on a scratch pad and chalk lines on a hangar floor? Yet, three views of this airplane have appeared—all profess to be authentic. Such is the case with most of the Goodyear designs available to us.

Choosing the Denight Special as the airplane to copy neatly solved this nasty problem. This racer was designed, and its construction supervised by Nicholas E. D'Apuzzo of Ambler, Pennsylvania—the Bristol area where the airplane was built by the Denight Aircraft Associates. Nick is one of those wonderful people who seem to realize the peculiar problems which we modelers can have. During the course of my research into the Special, I had nothing but unlimited cooperation from him; the result being authentic factory drawings of the original airplane. Then, as luck would have it, D'Apuzzo attended the Philly Nationals and had the chance to observe first-hand the three examples of our Denight model which were there. The Denight is but one of several highly successful full-scale machines which D'Apuzzo has developed, including the PJ-260 aerobatic biplane.

With the scale angle taken care of, the next chore was to be sure our model would be the quickest and most usable our experience could provide. The basic features of the Denight are not run-of-the-mill or taken from all other successful racers, by any means. However, these features were proven very well in our No. 1 Goodyear, the deBolt Special. Fundamentally, the concept involves absolutely clean lines, low-drag progressive laminar airfoil, solid stability and a minimum of frontal area. The greatest

change in the Denight was reduction to the minimum size required by the rules. No. 1 was nearly 10 percent oversize.

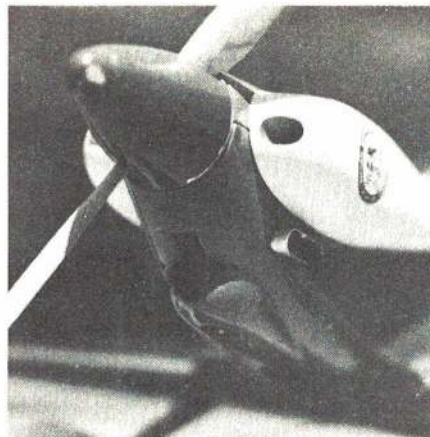
One new aerodynamic principle is the use of a single aileron for lateral control. The "why of it" can easily be seen: obviously, one is easier to install than two when both are not necessary. In addition, it is a simple search for more speed and ease of flight. NACA data indicates that a considerable portion of the wing drag comes from the openings around the ailerons. If you cut the number of ailerons in half, you are bound to have less drag (from the openings) by a factor of 50 percent.

Remember that the one remaining aileron still creates drag, especially when it is moved from neutral. If you place the one aileron on the right-hand wing panel, this panel will be on top when flying a left-hand pylon turn. Theoretically you use aileron to enter the turn; the off center drag as the wing is forced to perpendicular causes the airplane to yaw to the right as you enter the turn. What this means is that you can fly into the turns much harder with the nose down and yet the reaction from the single aileron will keep the model level as it progresses through the turn.

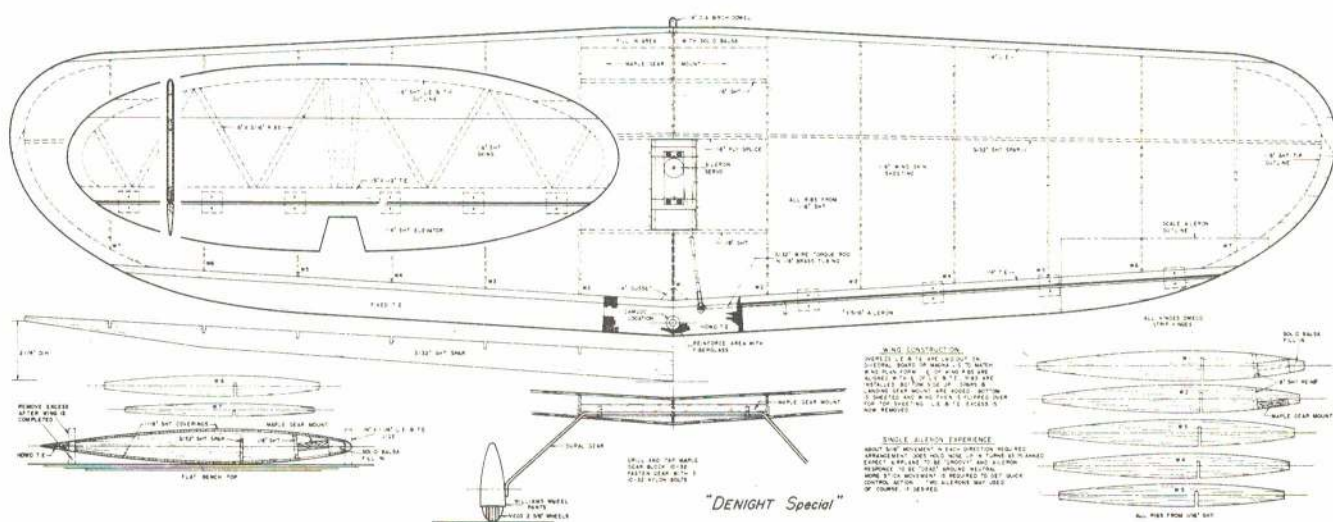
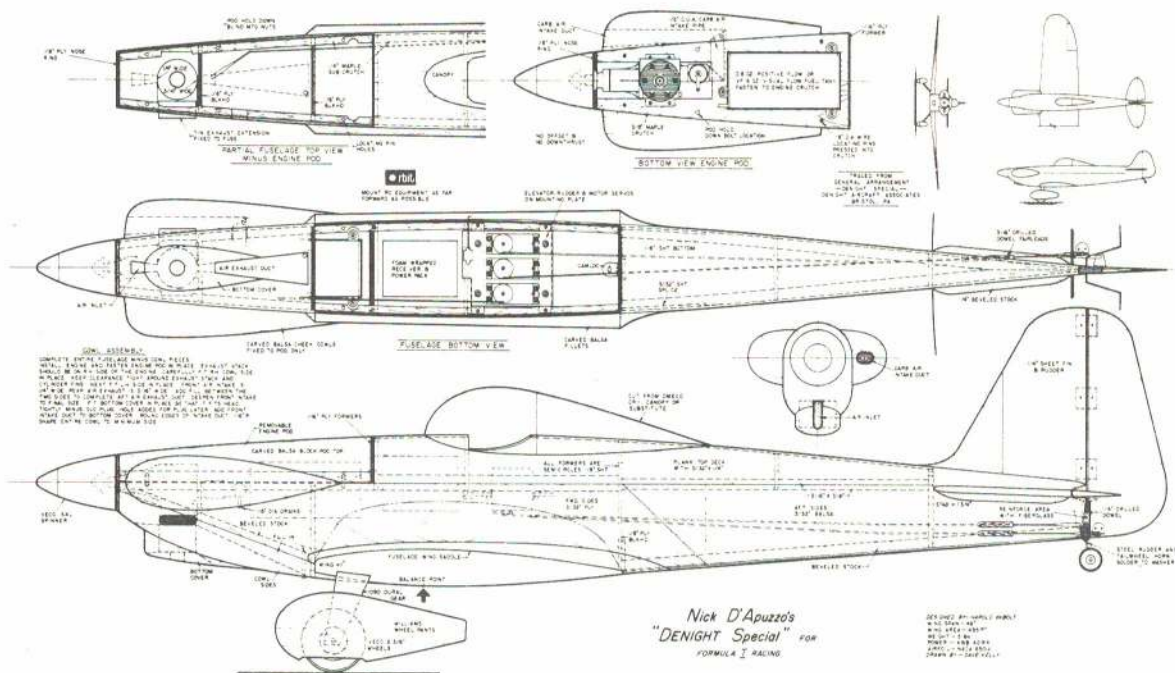
In actual usage this system can shake you up when you first shift to it from a dual-aileron system. Basically it works just as planned, except for two things: First, it takes a lot of guts to fly into the turns nose down, when all your past experience tells you that this is suicide. Secondly, you find that lateral control is quite dead around neutral on the control stick. Actually, the latter proves to be an asset as the model really grooves when our normal stick antics are not as effective! A bit more aileron movement is required for maneuvers; response from drastic stick actions is quite normal.

The big new thing about the Denight is the use of a power unit for the first time in an RC racer. The history of it is quite simple. All the ideas which I developed for control line speed years ago

(Continued on page 70)



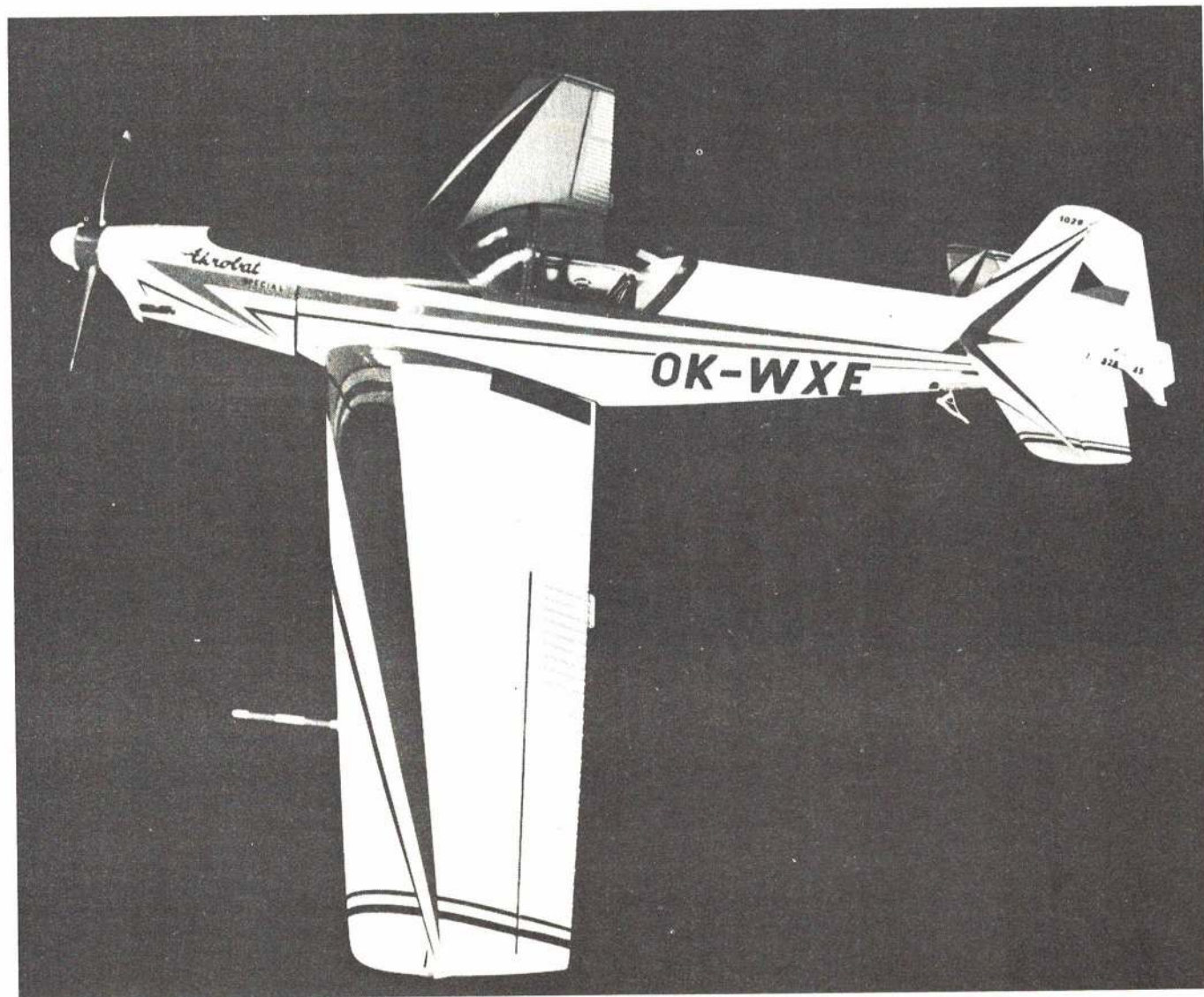
Note long narrow air intake for engine cylinder cooling. Exhaust outlet fitting is attached to body, not engine.

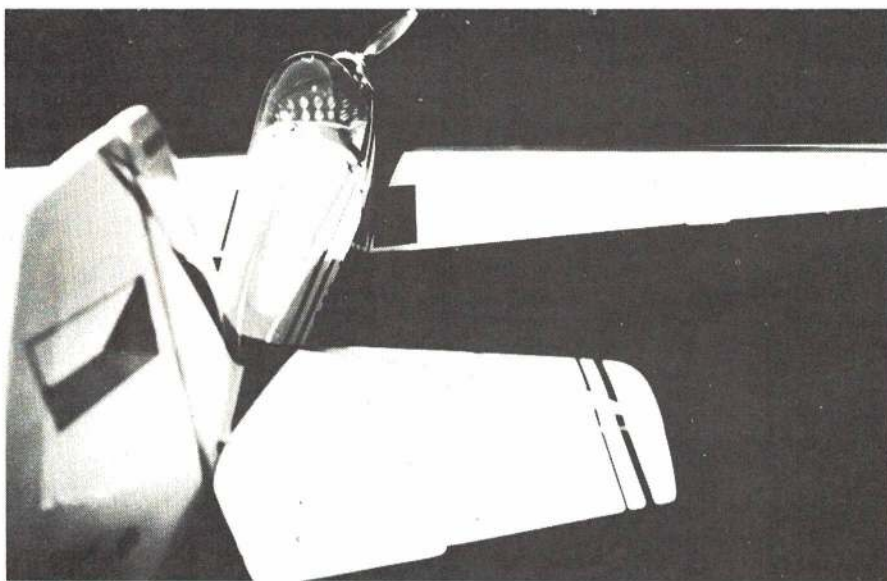


LONG FLOW LIFE EPOXY PAINT SMOOTHS OUT SO WELL
THE BRUSHMARKS DISAPPEAR. SAVE ON PAINT,
MASKING TAPE, TIME, AND HAVE NO OVER-SPRAY MESS.

Perfect Finish With A Brush?

by DON BOTTERON





So you don't have a spray outfit and everyone knows you can't brush Hobby-poxy—right? *Wrong!* By following a few simple guidelines this great sticky stuff is the easiest material available for use in obtaining a quality brushed-on finish. The prolonged flow-life and excellent covering qualities of this paint make it virtually impossible to detect brush marks in the finished product.

Somewhere in this country there must be someone who enjoys finishing airplanes. For me the chore falls somewhere between shoveling a wet, heavy Colorado snow off our three miles of sidewalk, and taking my wife shopping. I've tried about every finishing method and fad that ever came along. When I read an article on Hobbypoxy written by Bev Smith in 1963, I thought why not, it couldn't be that good but I've tried everything else. Naturally I never got past the part in the directions that said mix part A and part B, which I did, and proceeded to slop a coat of black on a freshly doped Jr. Falcon. Beautiful—it covered perfectly in one coat and looked like plastic. Two days later at the flying field I was an instant hero. That Falcon made everything else on the field look drab. Then a strange thing happened—my beautiful black plastic finish started to fall off in big chunks (maybe I did miss a little by not reading those directions).

There was never any doubt in my mind that if I could learn to use this stuff the beauty and durability of the finish was unbeatable. In the experience I've had and those related to me by other modelers, there are two basic problems with using Hobbypoxy paints. The first problem is the little bumps that look like mountains on that nice smooth and shiny background, and the second is making sure the airplane and the paint finish the flight together.

I will try to deal with the adhesion dilemma first. Most of us still cling to using dope as an underfill for our bare balsa and silk. Unfortunately, dope gives the appearance of being dry after about 15 minutes and lures us into thinking it is workable at that point. One word of caution: *Wait*. Solvents are working their way to the surface for at least 36 hours or longer if a heavy coat of dope was applied. When you seal off the surface with a nice airtight layer of Hobbypoxy before this venting is completed, a layer of gas forms between the two and they part company at the first opportunity. If you insist on using dope, apply no more than two coats in a 24-hour period and allow 48 hours after the final coat. Then be sure to break the glaze on the surface with steel wool or fine sandpaper before applying the final finish with Hobbypoxy. Even by using this method you are still taking a chance of losing a chunk or two of your finish when you pull off the masking tape after your trim colors.

Another technique which I haven't tried, but reportedly works, is brushing on a coat of Hobbypoxy filler thinned about 50-50 with dope thinner. The dope thinner causes the filler to penetrate and stick to the doped surface. After a thorough sanding you then have

a surface the color coats can stick to. However, if you are going to use Hobby-poxy colors, why not go the whole route and finish from the wood out with proven compatible materials?

Assuming you have completed construction on your new super bomb, you have no choice but to cover up that bare wood or whatever with something to keep the gunk from soaking it into a pile of mush. By now you've probably banged it into your workbench three or four times, dropped a screwdriver on it and gouged a big chunk out with your sanding block. Not even Hobbypoxy can cover those battle scars, so let's start by using an iron set about mid-range. Soak the ding with water so the wood is saturated, then hold the iron flat against it—make sure it's hot enough to sizzle a little. Except where you have actually lost part of the wood, the nicks will disappear like magic. Now with a paste-type spackling compound (I use Dap), fill any nicks and cracks that are left. Use a popsicle stick or something flat to apply it and smooth it out with a wet finger. This material is also excellent for forming fillets but will require two applications, as the first will shrink and form a hairline crack down the center of the fillet. After drying overnight it is very easily smoothed out with fine, dry sandpaper. While you are at it, give the plane one more shot with the sandpaper to make sure you have a good smooth base with which to work.

I'm basically too lazy to cover the entire plane with silk or paper and have not found it necessary. When I crash, it takes more than a layer of silk to hold things together. However, if there are some open areas, they are going to have to be covered with something. Try to stick with a material that does not sag after the first coats of clear have been applied. Coverite works well, as do the new paintable films. If you use silk, it will have to be filled with dope and, as I said before, you're on your own.

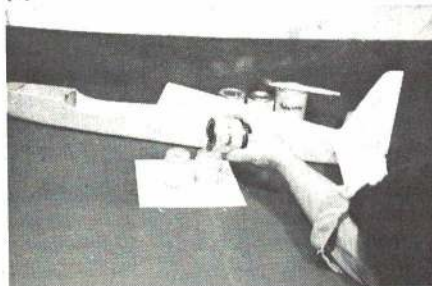
Now lay in a supply of baby food jars, decide what colors you are going to use and mix them all at once. You will learn how much as you get more familiar with the material, but figure about 2 oz. per coat for a 60-in. airplane. Set two jars side-by-side and pour equal amounts of color and hardener into each; then pour the hardener into the color and mix thoroughly. Let the mixed paint set for at least 45 minutes. Store everything but the clear in the freezer (it will stay good up to a month or more).

Brush on the first coat of clear (no thinner) and let set overnight. Knock down the rough grain with fine dry sandpaper and apply another coat of clear. If using the iron-on film, it's not necessary to apply the clear or filler. Again let dry overnight, but this time use No. 400 wet/dry Silicon Carbide Paper *wet*. Next come two coats of Hobbypoxy filler, mixed about 50-50 with thinner. By the time you finish applying the first coat it should be about dry enough to start over with the second. Start sanding the next night

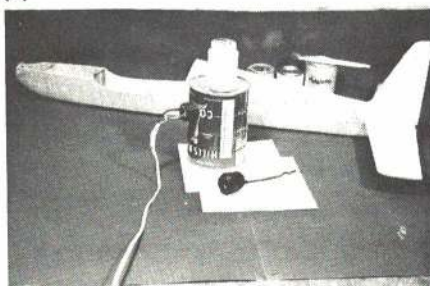
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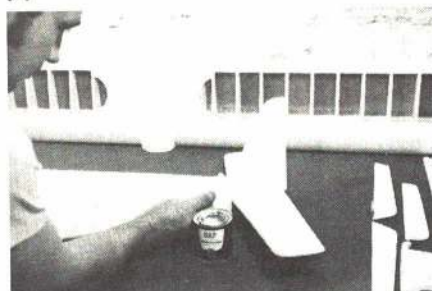
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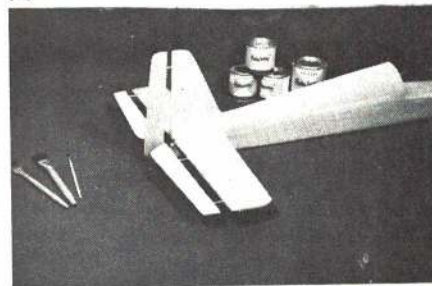
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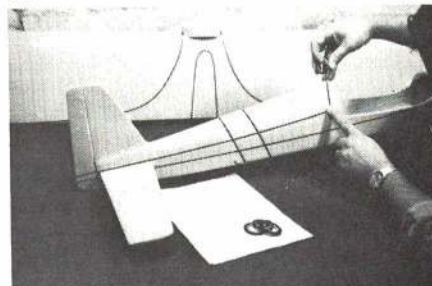
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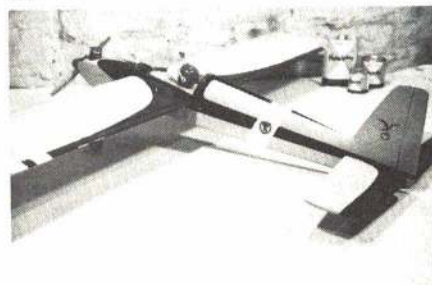
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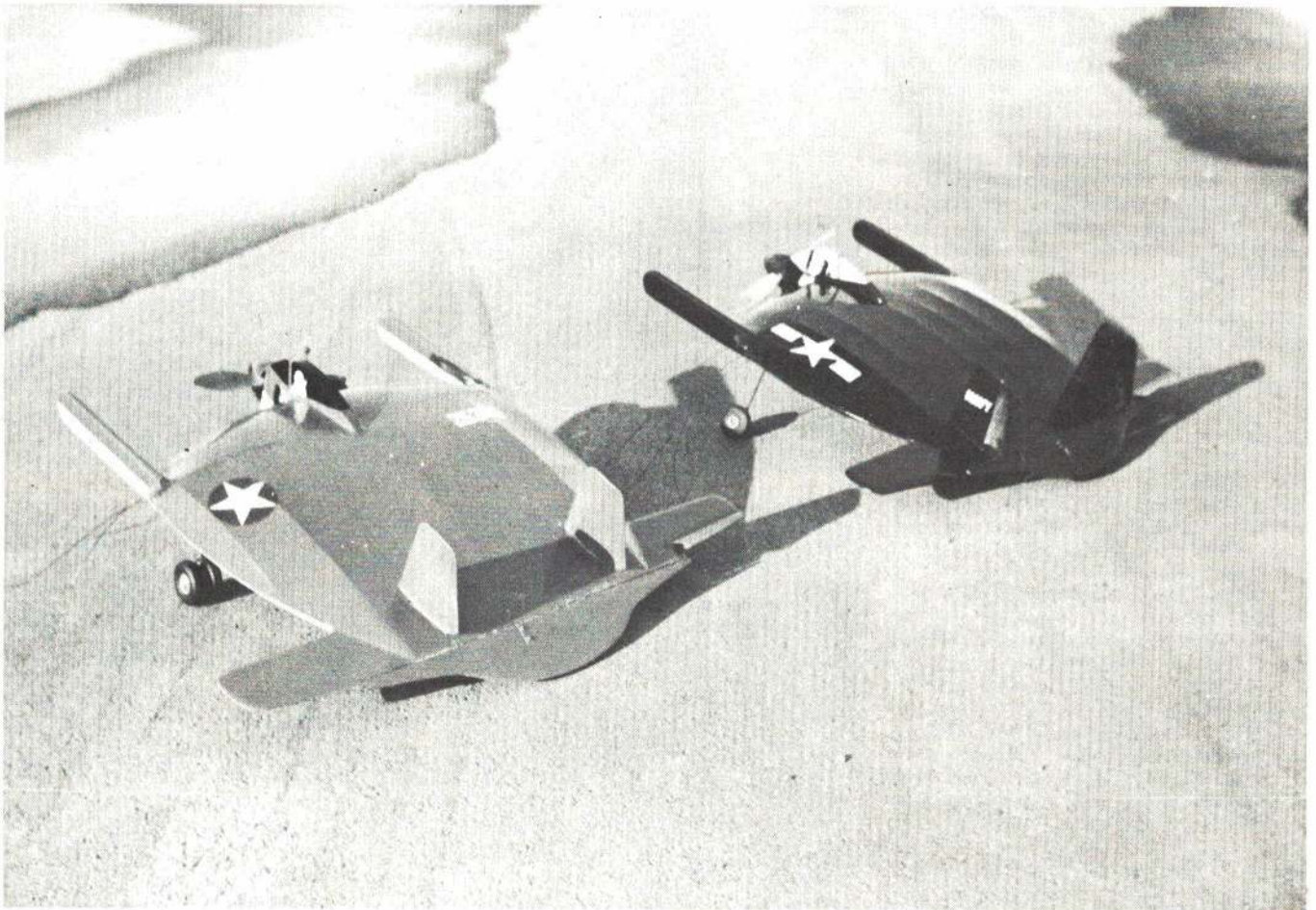


(1) Materials list for a brushed finish is not complicated by expensive equipment. (2) DAP spackling compound works well to fill nicks and scratches from rough handling. (3) After balsa sanding, prepare paint for two coats of Hobbypoxy clear. (4) This is how the plane must look after sanding down the two coats of filler. You're ready for color. (5) Secret to brushing is to heat the paint. Text tells how to make the heater shown here. (6) After wet sanding the two coats of color (white used here), begin trimming. No masking tape is needed when brushing. Electrical tape makes fine lines. (7) All trim was applied in one step. Add decals and you're finished. Author adds a coat of clear, too.

(Continued on page 57)

LIMA-BEAN SHAPED FIGHTER WAS BUILT TO BE OUR NAVY'S SHIPBOARD FLEET-DEFENSE FIGHTER. MODEL HAS EXCELLENT FLIGHT CHARACTERISTICS.

Chance Vought 'SKIMMER'



by FRANK SCOTT

Flying saucers were real! In the thirties an engineer named Charles Zimmerman formulated a theory concerning ultra-low aspect ratio wings that would have unusual high lift and low drag characteristics. His work seemed very promising and as a result Chance Vought, a company long known for remarkable aircraft, witness the Corsair, Cutlass, Crusader, etc., built a full-size man-carrying model to check out the feasibility of the radical design. The resulting V.173 aircraft was fairly conventional in structure, even fabric-covered with fixed landing gear, but being most startling in appearance with long prop shafts for the twin propellers protruding from the tips of the lima-bean shaped wing. Towards the rear of the machine sprouted an unlikely looking pair of stabilizers and twin vertical fins. The suc-

cess of this test airplane led to the construction of a fighter similar in appearance. It is this machine that we are concerned with.

The Chance Vought XF5U Skimmer (one of several unofficial names) was conceived as a shipboard fighter able to take off from small platforms on merchant vessels to defend convoys from attacking aircraft. It would be able to hover over its ship and land again on the platform, almost in the manner of a helicopter, yet capable of 388 miles per hour and having the convincing bite of 6 x 50 caliber machine guns. The conclusion of World War II and the promise of jets brought an end to development and testing and the completed Skimmer was scrapped without ever having been flown.

That was a pity of course, but the plane is nonetheless an intriguing subject for the modeler—unless you are the arch conservative type.

This distinctly odd configuration offers several points of interest to control-line modelers. It is definitely not a "run of the mill" design—one does get a bit tired of "Guardians." More important it possesses the good high and low speed characteristics necessary for a profile carrier model. The engine may be fitted snugly against the firewall to provide a measure of streamlining not ordinarily possible with an uncowed engine. Additionally, all equipment is easily fitted within the capacious structure, thus reducing drag. In high-speed flight then, the machine is well streamlined. However, during low speed, a remarkable aerodynamic transformation takes place. It is characteristic of generally delta-shaped wings that as the angle of attack increases—as in slow flight—the drag produced rises dramatically. Such is the case in this model and a bonus is that the large radius leading edge keeps the air flowing smoothly all the while thus making for a very stable and docile model throughout all flying speeds.

The single non-scale centrally mounted engine was chosen in order to keep things light and simple. In flight it detracts little from the appearance of the model. The structure is strong, rigid and, if built without warps, will remain that way.

Construction

The construction sequence is perhaps as unusual as the model itself, but it is simple, quick and need hold no terror for a modeler ready to advance from the famous "Ringmaster" type of model.

Begin with the heavy central "fuselage-rib." Cut this to shape, add the hardwood engine bearers and all ply doublers—be sure to remember the small tail doublers. After the glue has dried on these, drill the necessary engine mounting bolt, tailwheel and tailhook holes and install blind mounting nuts for the engine. Make sure your engine fits the mounts, and install the fuel tank as you would on a profile model. Follow with the tail-wheel strut and tailhook. Take care that the tail-wheel will not be in the way of the freely swinging tailhook.

The main wing spar is the next item. After cutting out the spar from strong 1/8" sheet balsa, the plywood landing gear mounts and bellcrank mount are glued in place. When the glue has dried, the landing gear struts may be secured to their mounts and the bellcrank with cable leadouts mounted.

Make up the two rear spars from 1/8 x 1/2" strip balsa and cut out all remaining ribs, firewall, tip pieces, leading edges and stabilizers. To save weight, large lightening holes should be cut in the ribs. (There just went a lot of wood!) Notice now that the ribs and spars will interlock to form a very stiff and robust frame. Carefully glue the main spar to the slot in the fuselage-rib (better use slow-drying glue from here on). While this is drying, glue the horizontal stabilizers to the hardwood trailing

edge spar and allow to dry.

Glue all ribs to the main spar and add the leading and trailing edges. Then follow with the top and bottom aft spars. Pin everything in place while the glue is drying. Be sure to inspect the frame closely for misalignments or warps, for once this structure has dried there isn't a tea kettle made that can steam out a warp. The wing tip pieces may be added now and this will pretty much complete the outline. Don't be in a rush to put on the dummy prop extensions—they will come much later.

While the frame is still open, it is a good chance to install your throttle control linkage. About the most satisfactory setup is a flexible pushrod, such as Nyrod, passing through the fuselage and thence curving forward to pass over (or under, depending on your engine) the fuel tank and out through the plywood firewall which may also be epoxied in place at this stage of assembly. You may wish to brace this last item wherever possible, and while you have some epoxy glue left over, smear it smoothly all over the firewall and engine area. There just isn't anything better for fuel and oil proofing.

To complete the fuel tank installation, slip plastic fuel line over the filler and vent tubes and, instead of bringing the tubes out the top and bottom of the plane, run the tubes forward out through the firewall. This will not only look more professional, but will eliminate any possibility of siphoning. I didn't think of this in time and my filler tube has siphoned like crazy at high angles as the tube is in a low pressure area.

A bit of wing tip weight attached to the inside of the right tip rib will help keep the control lines tight. The forward portion of the wing, from leading edge to main spar, should be ready for sheeting. Use soft, thoroughly soaked sheet balsa for this. Slow-drying glue, a lot of cutting and fitting, a bunch of pins, and mostly patience will be needed there to handle properly this compound curvature. But when the carving and sanding is done the leading edge will be smooth and immensely strong—which is necessary because of the unusual landing gear location. The 1/16" sheeting at the trailing edge is flat and will cause no problems.

Our attention is next turned to the elevator. Cut out the plywood elevator hinges and glue them in place. Next cut out the elevator from a hard piece of balsa and gouge out recesses for the 1/16" dia. wire hinge pins and attach the control horn in the location shown. Hinge the elevator in the manner common to current combat jobs. While bending the pushrod, keep in mind that the model will normally require a small amount of "up" elevator to fly level since it is a flying wing with a symmetrical airfoil. Thus a few degrees of up elevator with the bellcrank neutralized may be beneficial. Unless of course you intend some inverted flight in which case neutral bellcrank should yield neutral elevator as usual, with equal up and down elevator travel.

Really hard balsa is needed for the dummy propeller shaft housings—the

reason being twofold: If you should nose over on landing, your plane will be sliding on them; they may tend to resonate at certain engine speeds. This will vary with each model. After the glue has dried, carve and sand the rear portions of these housings to blend with the tip.

The covering support piece on the left underside is there to form a slot in the completed model through which the pushrod and tail-wheel strut pass and to allow the tailhook to be stowed inside. It is a simple matter to arrange a catch on the pushrod so that "blipping" full down will release the hook allowing it to drop.

Your Skimmer should now be ready for covering after it is sanded smooth and given a couple of coats of clear dope. We suggest using a covering fabric, such as silk, rather than paper, as covering the whole model is like covering a huge wing tip. With time, patience, and a Windex sprayer to keep things wet, top and bottom can each be covered in one piece of silk.

After the silk is trimmed, the two vertical fins may be glued into their slots. It's a lot easier than trying to cover around them. A few coats of clear to seal and some light sanding and you'll be ready to color dope.

The actual airplane was painted midnight blue overall, while the earlier fighter mock-up (non-flying) was given the more attractive three-tone blue color scheme.

When you are soldering on your wheels, use only two main wheels rather than the real plane's dual wheels. Indeed the duals look better, but they add that much more drag and more importantly, weight. This weight hanging from the tips of the short wing can act somewhat as a pendulum and under certain conditions cause a strange undulating flight. Incidentally, the longer-than-scale tail-wheel strut is recommended to keep the horizontal stabilizers from hitting the ground on bouncy landings.

About all that's left now is to bolt on the engine and attend to the final rites prior to flight. Due to its unusually long chord the "Skimmer" is quite tolerant regarding its CG, though for the initial flying we would suggest that the model balance at the main spar. As you become familiar with the machine, the CG can be progressively moved aft to increase control response if desired. You may be surprised how far you can shift it back.

The success of your Skimmer depends of course upon your engine. The airplane will do its share. Ours have reached 70 mph and will slow down handily to 20 mph. It will easily get off of a carrier deck and its high rate of sink, power off, assures accuracy in landings.

In competition it seems well to fly this airplane as low as you can. Its abundant stability makes this easy, and while flying high may shorten the flying radius, the model will require a somewhat higher angle of attack and this means drag. At low speed the advantage of the longer radius is obvious; in addition, the landing will be softer if you have engine failure while flying "on the backside."



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**TOP FLITE MAKES A PROP FOR YOUR MODEL . . . WHATEVER
IT IS! AVAILABLE AT ALL LEADING MODEL SHOPS.**

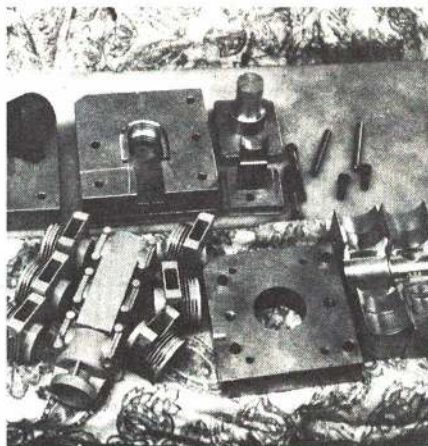
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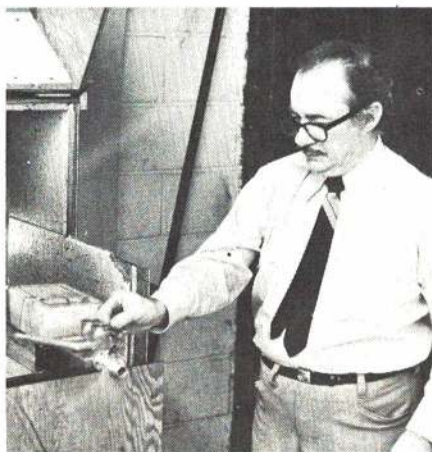
TOP FLITE MODELS, INC.
2635 South Wabash Avenue
Chicago, Illinois 60616



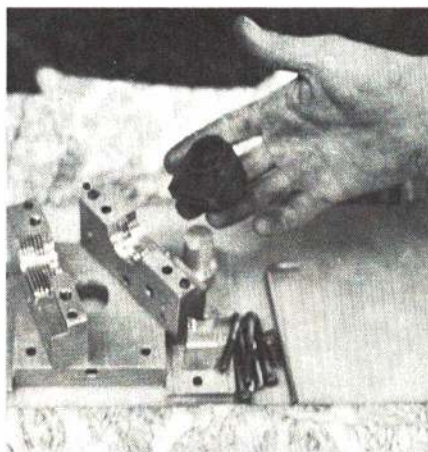
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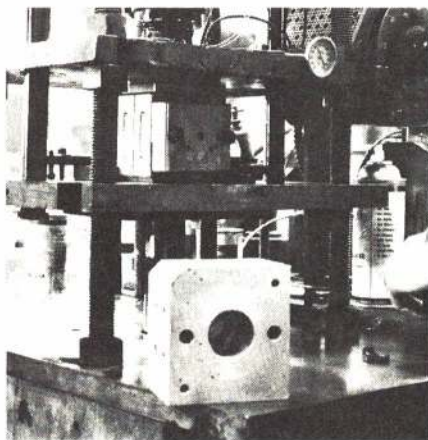
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(3)



(7)



(4)

(1) This biplane was co-owned by Lou as a teenager. Note a Morton M5 and a real miniature jet engine on display. (2) Lou Ross operating the inline twin for the first run. This is a powerhouse engine. (3) Bill Steffen, Northfield President, has been bit by the modeling bug. An enthusiastic manufacturer. (4) Black part is a finished wax impression which came out of the aluminum cavity in which it was molded. Note how many parts there are to the mold. (5) This gives some idea of how individual wax impressions are joined to make multiple cylinder engines. (6) Wax impressions of cylinder assembly and its mold. (7) The wax molding machine.

ON THE SCENE

AAM Visits The Engineer, Lou Ross

Much admired today are the twin, four-, and six-cylinder engines now available from Northfield-Ross. Lou Ross, a modeler from years ago when Bombshells and Clippers were the rage and only free flight was known, got interested in our hobby again after discovering the activity at an RC club's field outside of New York. He observed that the modelers were operating big single-cylinder vibrating 60's on their planes and commented: "Why don't you use a horizontally opposed twin which has no vibration?" Well, one thing lead to another, and some fun in his basement workshop started the beginning of what is now the Ross Twin 60 engine.

AAM's Editor went north for a day with Lou Ross. That day was spent traveling the freeways of New York City and Long Island rounding up components from the various suppliers of engine components and several hours admiring the Northfield manufacturing facility.

Briefly, here's how this series of engines is made. Have you heard of "investment casting?" It is a process by which a wax example of the crankcase is molded, then mounted in a small tub. A soup, the investment, is poured into the tub and hardens, then the whole tub is heated in a very hot furnace. This cooking causes the wax to vaporize leaving the cavity of the motor. Next, molten aluminum is forced into the cavity and into all the tiny segments, fins, mounting studs, etc. When the aluminum cools, the casting is broken releasing the aluminum crankcase.

As with most other motors, the cylinder liner, crankshaft, cylinder heads, drive washer, etc. are machined from solid. The Ross pistons are forged. Each part, after final machining, is heat



(8)



(11)



(9)



(12)

by ED SWEENEY

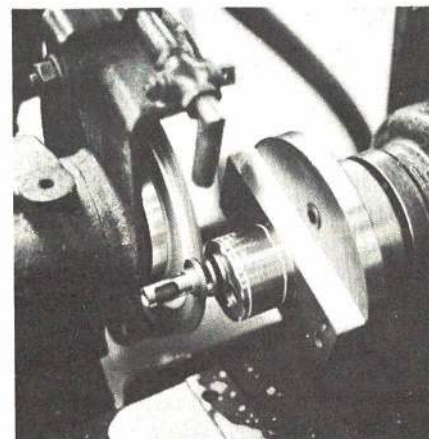
treated for hardness and durability. The crankshaft and liner are ground after hardening.

Since I am not an engine man at all, there's no point trying to describe any design features of the Ross engines. I'll just cover the types of engines available from Ross which follow the above manufacturing sequence and which are seen in the photos.

There are two twins basically. One is rear shaft valve induction and the other is a series of reed valve induction motors. Each motor can be bought with up, down, or rear exhaust. They are also available in black anodized finish or plain aluminum. It is an oversimplification, but true that Lou's four- and six-cylinder engines are just multiple versions of the twin. When the wax impressions are made and assembled, the casting plant simply assembles more wax parts together. The rest of the process is the same.

New developments at Northfield-Ross include a big single-cylinder powerhouse 60 and an inline twin. Someday Lou will get back to the project of making a practical model radial engine of three or five cylinders. Incidentally, these use the very same wax cylinder impressions!

Two comments can be made about the final machining and finishing done at Northfield. One is that they manufacture a series of Military Specifications air-operated chucks of incredible accuracy. Second, almost every employee is a Sicilian either by birth or immediate ancestry—Sicilians are master machinists. Every step in the machining process of the Ross engines has one multiple function chuck to hold the part. It is the quality of these chucks and the Sicilian machinists that make the engines so beautiful.



(10)



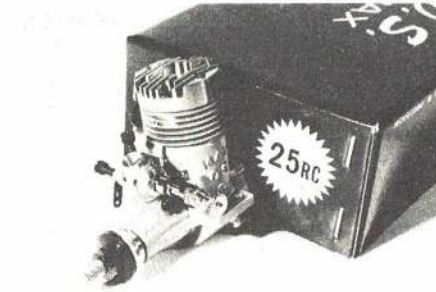
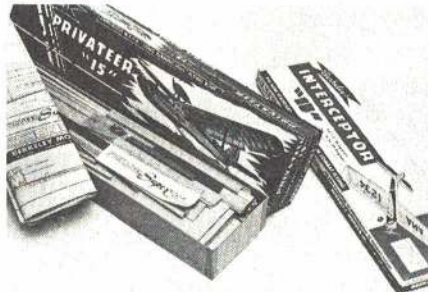
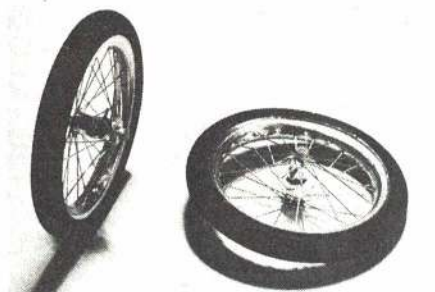
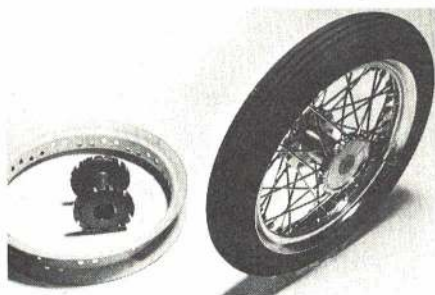
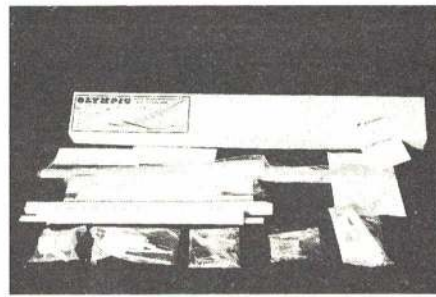
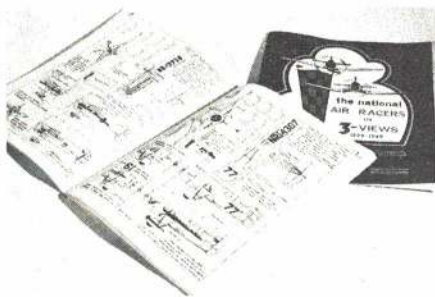
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(14)

(8) Assembling the twin opposed 60. Parts are glued together with Testor's plastic cement! (9) Wax impressions in the tubs mounted on "trees." (10) Machining the crankshaft on automatic equipment at Northfield. For this photo, the cooling liquid was turned off briefly—sparks were flying everywhere. (11) Pat Nazzaro grinds the cylinder liner bores on a Heald automatic internal grinder. (12) Parts awaiting assembly. Note crankshaft in foreground of a six-cylinder horizontally opposed engine. (13) Lou and Pat ran six for me. Never have you heard a sound like this before—it was frightening. Exhaust stacks and carburetors face straight up. Sounds beautiful burbling along at idle. (14) A study of wheels turning and static.



new products check list



Diane Publishing Co./National Air Racers. Dealing with the National Air Races during the "Golden Era" from 1929 to 1949, this book provides excellent three-views of most of the great racers which flew in this colorful event. Over ninety planes covered, including Doolittle's Laird "Super Solution," Wedell-Williams "57", the GeeBee's, up to the post-WW II F4U and P-51's. Truly outstanding research. Authored by Mendenhall. \$3.95. The Diane Publishing Co., Box 2726, Rochester, N.Y. 14626

Milman/Stanton/Antique wheels: Two Approaches. Two beautiful approaches to realism in the difficult-to-do-it-yourself field of spoked antique wheels. Milman wheels (top) are big, beautiful, rugged enough for any RC scale application, built by company with background in precision tools. Steel spokes, nylon bushings, nickel plate finish, treaded or smooth Buna tires, in sizes from 2-3/8 to 5", \$12.95 to \$20.95/pr. Milman Engineering Co., Inc., 1669 12th St., Santa Monica, Calif. 90404

For small scale models, rubber or gas-powered, Stanton wheels (bottom) are made of silk thread and balsa wood, only one gram each but can support up to three-lb. static load. Teflon bearings, available in 15 realistic diameters and styles for all antique scale applications. 1/2 to 1-1/2", all sizes \$3.85. Stanton Hobby Shop, Inc., 4734 N. Milwaukee Ave., Chicago, Ill. 60630

Testors/Fluorescent paints. One kit contains six 1/4-fl. oz. bottles of high-visibility fluorescent plastic paints in orange, green, red, blue, yellow, hot pink. Special effects, safety stripes, wild color schemes all possible with this kit. Thinner and brush included. \$1.39. The Testor Corp., 620 Buckbee St., Rockford, Ill. 61101

CMI/Pen Bladders. Highest quality gun rubber, bladders are billed to provide twice the fuel pressure of any other bladder on market. With line and hardware, one size only; smaller bladders can be made by cutting to desired length. 59 cents. CMI Quality Airplane Kits, Box 79, Des Moines, Iowa 50301

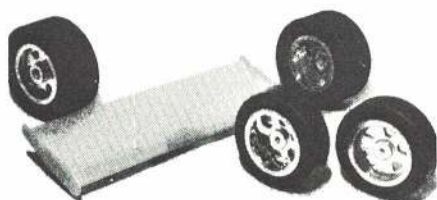
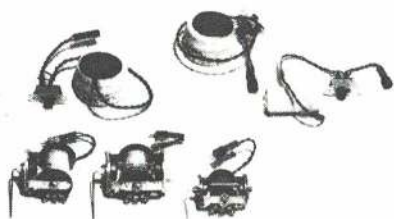
Polk Hobby Dept. Store/Two old-timers. Original Berkeley Models, available in limited supply. Two representative kits shown: *Privateer 15* flying boat is designed for RC applications, has self-draining wing and hull, watertight RC compartment, pylon-mounted engine, 60" span and designed for 09 to 15 power. Also, combat CL *Interceptor 15*, 33-1/2-in. span, pre-shaped fuselage, complete hardware. 15 to 25 power. Polk's Hobby Dept. Store, 314 5th Ave., New York, N.Y. 10001

Airtronics/RC sailplane. 99" span *Olympic* is proven performer for slope or thermal flying. All fuselage parts pre-cut and machined, hand-selected premium balsa, complete hardware, 12 to 18 hours construction time. In two versions, 99 (shown) with 790 sq. in. wing, 40 to 44 oz. complete. 88 has 695 sq. in. wing, 38 to 42 oz. Either version, \$34.95. Accessory power pod for 09 to 15 engine, \$7.50; adjustable tow hook, \$3.50; standard hook, 75 cents; heavy-duty hook, \$1.50, all shown with basic kit. Airtronics, Box 132, Sierra Madre, Calif. 91024

Stanton/Hi-performance 15 engine. Available in glow plug or diesel, Italian import *Kosmic* has Schnuerle-type porting, rear rotor, lapped piston, two ball bearings. Power, 0.68 at 24,000 rpm for glow plug (show), \$27.50, and 0.54 at 18,500 rpm for diesel, \$29.95. Beautiful finish and excellent craftsmanship throughout. Stanton Hobby Shop, Inc., 4734 N. Milwaukee Ave., Chicago, Ill. 60630

World Engines/New-size RC engine. Filling the needed in-between size, new O.S. Max 25 RC is ideal for most RC trainers. World Engines, Inc., 8960 Rossash Ave., Cincinnati, Ohio 45326

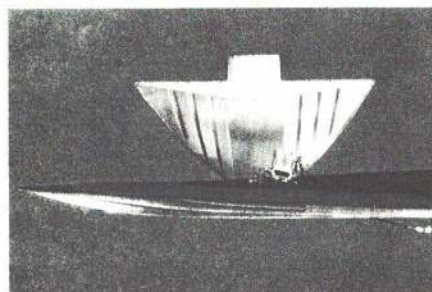
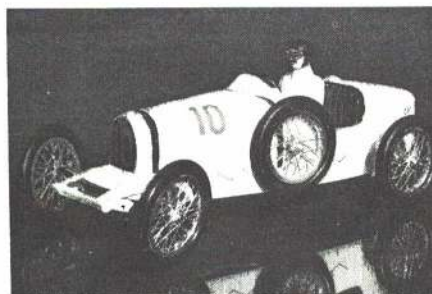
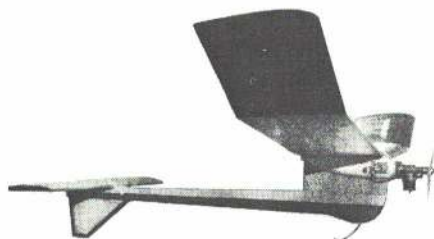
by FRANK PIERCE



Ace RC/Optional actuators and batteries. Upgrade the performance and power of Ace pulse proportional equipment with Baby Twin (\$10.95) at right, Standard Single (\$7.95) at left, or Twin Stomper (\$10.95) in center. Also 500 ma NiCads to provide extra power (upper center). Standard 225-ma NiCad shown for comparison. All part of ACE Commander '72 line. ACE RC, Inc., 203 W. 19th St., Higginsville, Mo. 64037

Jerobee/Accessories for racer. Custom race tire set with chrome rims, extra-true turned tires expose soft rubber for better traction. Also, wing for better rear-end holding at racing speeds. Wheels, \$9 per set; wing, \$2.95. Jerobee Industries, Inc., 12702A N.E. 124th St., Kirkland, Wash. 98033

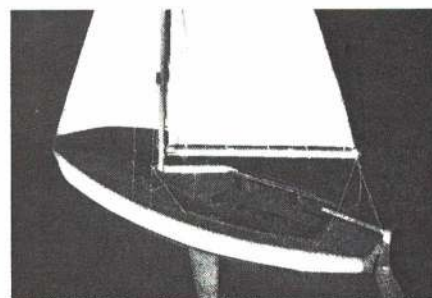
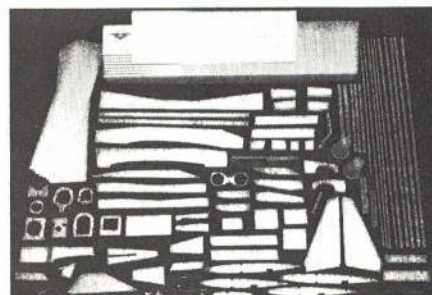
Testors/Accessories for better flying. Packaged performance in the shape of special-design starting battery for glow plug engine, fuel compounded especially for Testors engine, glow-plug head wrench, \$3.75. Also power package consisting of high-performance prop for CL planes, heavy-duty control line. For those who have mastered the basics and want something just a bit hotter. The Testor Corp., 620 Buckbee St., Rockford, Ill. 61101



Sig Mfg./Free-flight. New addition to present line of free-flight models, ABC Scrambler was winner at '71 Nats. Geodetic wing is 570 sq. in., can be flown in three events by switching engines from 15 to 35 sizes. With die-cut parts and covering material, \$9.50. Sig Manufacturing Co., Inc., 401 S. Front St., Montezuma, Iowa 50171

C & F Mfg./Scale classic racer. In 1/8-scale, Type 37A Bugatti could be a real show-stopper when lined up against the Porsches at the next rally. Straight from the famous road races of the 1920s, kit features wire wheels, aluminum chassis, steel rear axle, vacuum-formed car body and driver. For RC or display, \$34.95. C & F Manufacturing, 1047 Cheyenne St., Costa Mesa, Calif. 92626

Fisher/RC ski boat Northwind. Graceful high-performance RC boat is 33" long, capable of almost 40 knots with 40 to 60 power. All molded hand cloth layup fiberglass hull, complete instruction data including full-size plans and photographs. Legal for all N.A.M.B.A. and I.M.P.B.A. events. Available now for \$39.95. Coming soon: Scaled down 19-power version "Li" Northwind." Boats by Fisher, 10604 17th St. S.W., Seattle, Wash. 98146

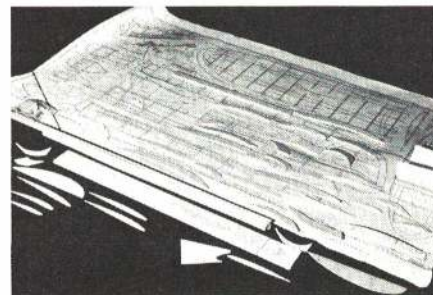
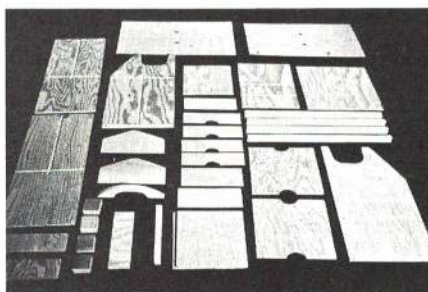
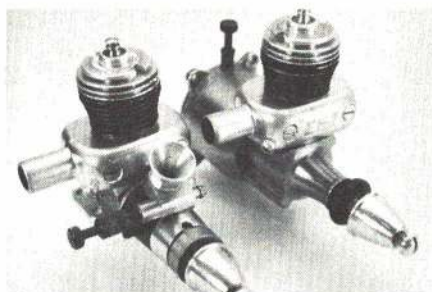
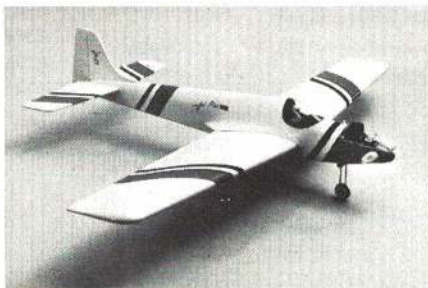
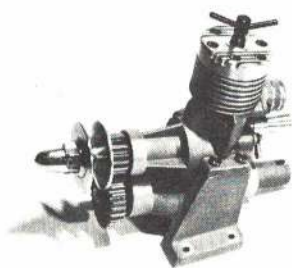


Royal Products/F4J Phantom. RC version of McDonnell Douglas fighter, kit has 477-sq. in. wing, 43-1/2" fuselage, recommended for 49 to 60 power. Built-up construction, all parts pre-cut and necessary hardware included. In Navy colors, about \$50. Royal Products Corp., 6190 E. Evans Ave., Denver, Colo. 80222

Dumas/Lightning-class sailboat. 1" to 1' scale, 19" model is built with plywood frames and mahogany planking. Equally suited for display or sailing. Full instructions for easy, accurate assembly, \$9.95. Also available: Similar kits for Sunfish, Star and Hobie Cat boats. Dumas Products Inc., 790 S. Park Ave., Tucson, Ariz. 85716

E.T. Enterprises/Racing fuels. Basic ingredients for almost all high-performance fuels in bulk form for making own blends. Castor Oil, Nitromethane, Sport fuel concentrate, etc. Also custom-blended fuels. For additional information on prices, products, send 10 cents to E. T. Enterprises, 705 Huntington, Mount Clemens, Mich. 48043

new products check list



Stanton/Marine engine mount. With Kosmic glow plug version shown elsewhere in this column, this is the diesel, mounted on Kosmic marine engine mount. Mount, complete with spare parts, \$16.95. Stanton Hobby Shop Inc., 4734 N. Milwaukee Ave., Chicago, Ill. 60630

Tatone Products/Cox mufflers. Two new mufflers, designed for Cox Tee Dee 049, Medallion 049, Baby Bee and Golden Bee 049 engines, weigh just over one-half oz., strap over cylinder with two screws. Exhaust can be directed either left or right for mounting convenience. Tail tube restrictor can be removed for extra revs when muffler is not needed. EM-7A for current Cox engines, EM-7B for pre-1970 (thin cylinder) models. \$2.95. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112

K & S Engineering/Field soldering iron. 30-watt soldering iron allows emergency repairs in the field. Up to heat in just one minute, iron uses 12-volt input from car lighter socket. The model 212 can be used for all kinds of light soldering for models or even auto repairs. \$2.95. K & S Engineering, 6917 W. 59th St., Chicago, Ill. 60638

Model Aircraft Co./Four-channel RC 60. Foam wing and built-up fuselage. Jet Star flies well on 56 to 61 engines. Kit features full-size plans, step-by-step building instructions, die-cut and pre-sanded parts, fuselage alignment jig for extra accuracy in construction. 65" span, 6 lb. flying weight. \$48.95. From "MACO," Model Aircraft Co., 694 Shadow Wood Lane, Webster, N. Y. 14580

G & K/Flight kit. All plywood construction, pre-cut and grooved for speedy accurate assembly. Features front and rear doors, pull-out drawers space for transmitter, other odd gear. \$24.50. Fuller G & K Products, 3521 Trevis Way, Carmel, Calif. 93921

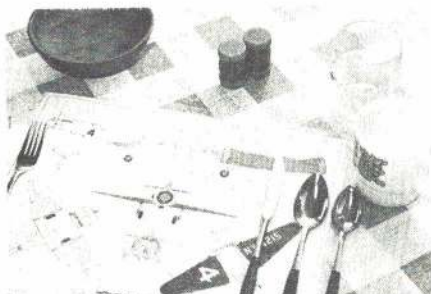
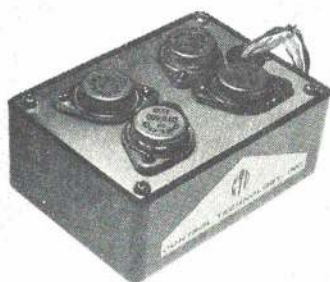
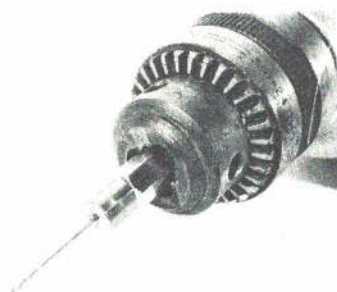
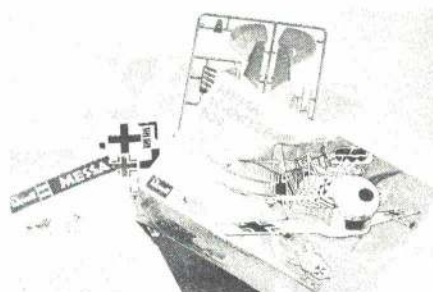
Signal Aircraft Books/Luftwaffe in Action. An unusual book both in scope and content, *Luftwaffe in Action* covers real action photos (not factory publicity shots) of FW-190, FW-189, Condor, JU-52, Blohm and Voss BV-138. By concentrating on these few models, coverage can be unusually detailed. First-time publication for at least 80% of pix. \$3.50. The Squadron Shop Inc., 23500 John R., Hazel Park, Mich. 48030

Mason-Renshaw/Flying Wing. A truly unusual towline-launched glider capable of out-of-sight performance. Swift Eagle is constructed from two pre-formed styrofoam wings, colorful flight decals. This one-of-a-kind is available in limited quantities for \$2.98 from Mason-Renshaw Industries (plus \$1 per order for shipping), 6315 East Coast Highway, Carpinteria, Calif. 93013

Sig Mfg. Co./Schweizer 1-30. One-inch scale kit of long-distance light-powered craft version of 1-28 sailplane, 40" model can be flown free-flight, CL, or with small single-channel RC installation. Long tapered sailplane wing carried over into this model. Engines from 010 to 049 are recommended, depending on use. With molded canopy and cowling. \$4.95. Sig Mfg. Co. Inc., 401 S. Front St., Montezuma, Iowa 50171

Hobbies Unlimited/Old-Timer free flight. Styled after the great free-flight models of the early forties, kit is based on Henry Struck's 1940 record-setting "New Ruler." High-wing pylon, open cockpit, elliptical wings and tail all combine to make a truly lovely ship. Sig balsa, full-length longerons for extra strength, 6', 5.8 sq. ft. wing, 3 lb. flying weight, powered by 35 glow plug or any good ignition engine (such as Super Cyclone). \$29.95. Hobbies Unlimited, 23262 S.E. 57th St., Issaquah, Wash. 98027

by FRANK PIERCE



Octura/Ball thrust bearings. For 19 to 40 engines, new bearing is 3/8" outside diameter to fit 3/16" shaft. Ten 1/16" dia. steel bearings in metal cage and two hardened steel washers. For Octura OC-6DM drive dog. Ask for Octura OC-6TBM. \$2.50. Octura Models, 8148 N. Milwaukee Ave., Niles, Ill. 60648

KANDU/Drill sets. Highest quality industrial drills with hexagonal brass handles bonded permanently to drill shaft. In all sizes, 19 through 80, with size stamped on handle. For power or hand operation. Write for prices, packaging and selection directly to manufacturer. KANDU, Kenneth A. Norris Developments Unlimited, Inc., 6115 Miller St., Arvada, Colo. 80002

Royal Products/F4U Corsair. Latest addition to scale line, WWII Navy/Marine fighter kit contains all necessary hardware, and features balsa built-up construction. Scale 1:8; span, 61 1/2"; 60 power recommended. \$69.95. Royal Products Corp., 6190 E. Evans Ave., Denver, Colo. 80222

Graphics Designs/Club insignia. Dress up and personalize your flight box and other equipment with engraved colored metal insignia plates in solid colors of black, red, blue, green, gold. Any insignia original up to 4 x 5" can be copied full-size. Include name and AMA number (maximum three lines, 25 characters per line) and check or money order for \$4. Graphics Designs, Box 187, Brookfield Center, Conn. 06805

Control Technology, Inc./Speed control. Replaces conventional servo, operates directly from digital receiver to control electronically forward and reverse speeds of marine electric motors. All transistorized, operates from 12-volt motor supply, and has low current drain. Circuit-breaker protected. \$49.95. Additional data, write Control Technology, Inc., 344 Hamilton, Birmingham, Mich. 48011

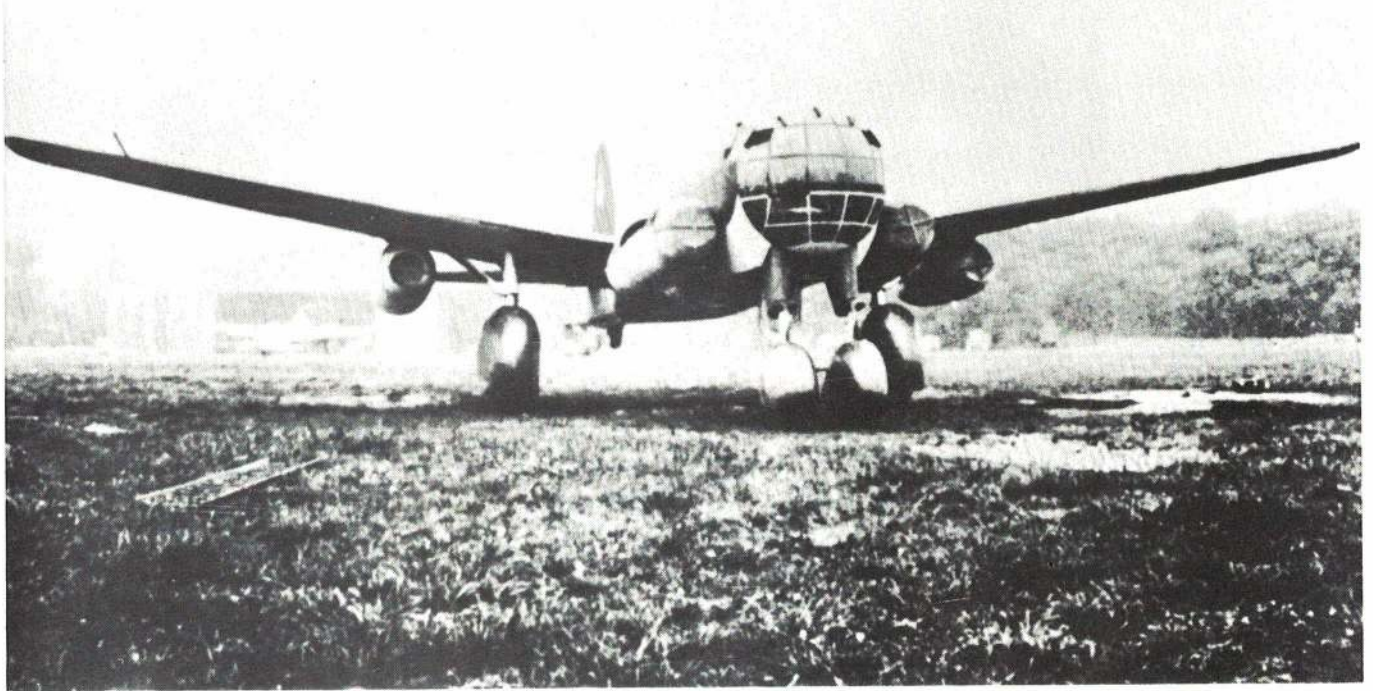
Raceplanes/Placemats. Great for the game-room, something to be valued by the hangar flier. Set of six five-view drawings set in heavy water- and heat-proof plastic mylar placemats. Mr. Mulligan, Travel Air, Gee Bee, others. All six, \$9.60; \$1.60 each. Door prizes, anybody? Air Racing Research Associates, 8439 Dale St., Buena Park, Calif. 90620

Revell/More from Deal's Wheels. The successor to der Red Baron in the second Great Unpleasantness, Wiener Moldy rips apart the skies of the European theatre, blasting his way to ignominy in his full-blown Messerschmitt Me-109. Wild gold flake color, hardly Luftwaffe standard, but very interesting. \$2.25. Revell, Inc., Venice, Calif. 90291

Prather Products/Power-pack. All-in-one starting battery, plug tester, battery checker with rechargeable NiCad battery. Eliminates lost time trying to start with dead battery and/or sick glow plug. Beautiful equipment. \$29.95. Prather Products, 1660 Ravenna, Wilmington, Calif. 90744

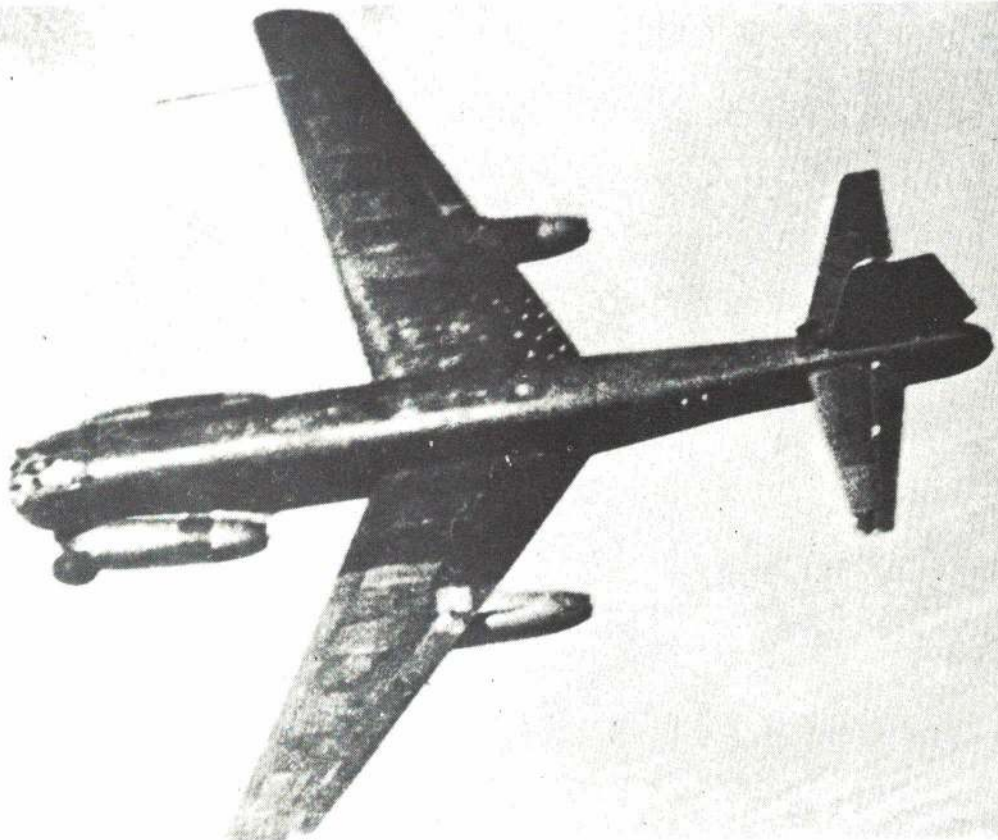
Northfield/Ross Twin. Renowned for the smoothness that only a twin can give, saves wear on airframe, electronics. Lightweight, high power, compact and beautifully finished. Perry carburetor-equipped. Write for more details. Northfield Precision Instrument Corp., 4400 Austin Blvd., Island Park, N.Y. 11558

A WEIRD AIRCRAFT, ITS WINGS SWEEPED FORWARD,
ITS FOUR ENGINES HAD MOST UNIQUE LOCATIONS,
AND IT SPORTS TWO NOSE WHEELS AND A TAIL-WHEEL!

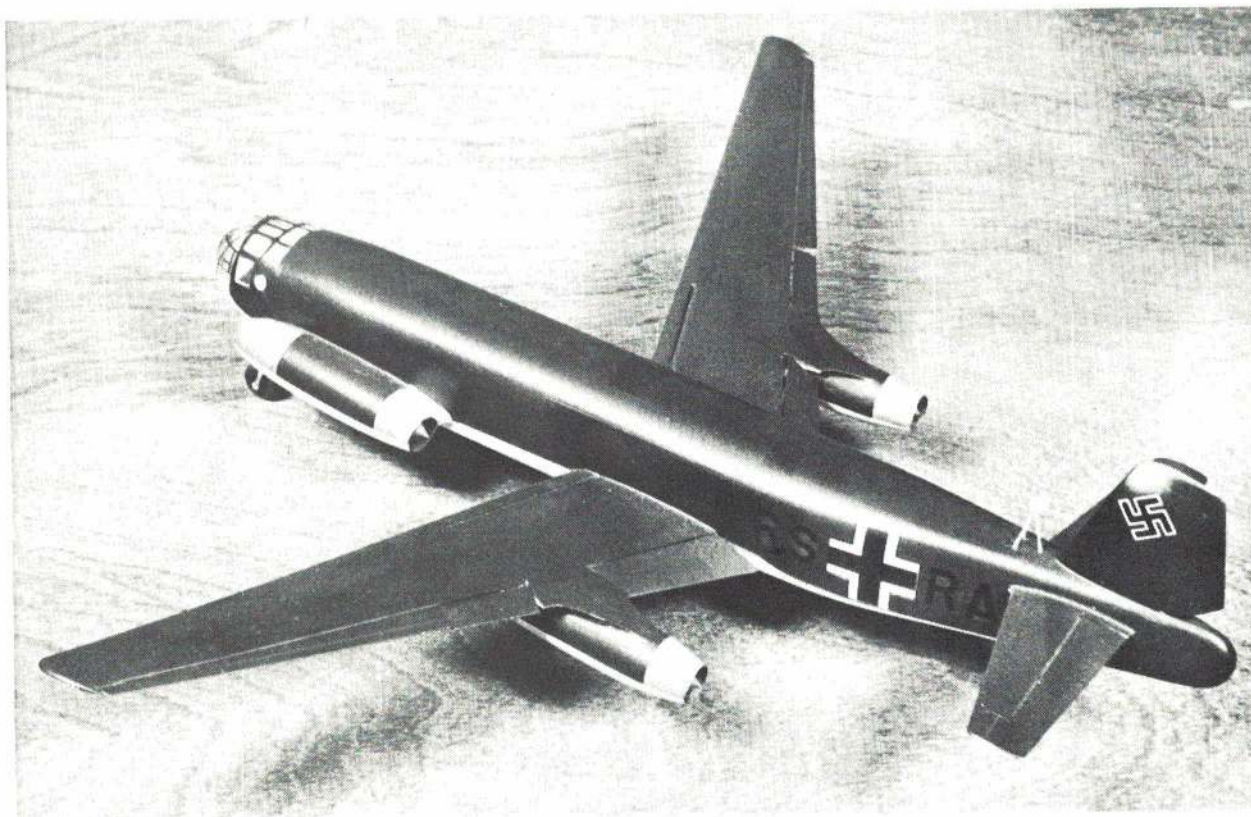


Wrong way Junkers

by RICHARD MARMO and JENE PROCKNOW



Photos by William Green



It takes four different plastic model kits and a homemade rear fuselage to build up one JU 287 model. Note scale unpainted tip of vertical fin.

During the course of WWII, virtually every combatant nation eventually turned, to one degree or another, to the unorthodox aircraft design. While they didn't have a monopoly in that field, Germany possessed the lion's share of the designs.

In their search for a large bomber design capable of evading interception by Allied fighters, a Junkers design team evolved the concept of the swept-forward wing planform.

Although a normal swept-wing configuration provided much desired speed advantages, a major drawback was the poor handling characteristics possessed at the low end of the speed scale. Thus, the swept-forward concept was developed as a means of transferring the poorest handling characteristics to the upper end of the speed scale where they could be most easily controlled. That the concept was successful is evidenced by the fact that the swept-forward planform can still be found today on the production line of Germany's Hansa executive jet.

The subject of this article, the Junkers JU-287V-1, was the first aerodynamic testbed for the proposed three-seat bomber. Dimensions of the prototype were as follows: Span—65 ft. 11 $\frac{3}{4}$ in.; length—60 ft. $\frac{1}{2}$ in.; wing area—656,598 sq. ft.; maximum speed—347 mph at 19,685 ft.; normal cruising speed—318 mph at 22,965 ft.

Like so many of the German designs born out of desperation during the latter half of the war, the JU-287 would have presented many problems for the Allies had production been achieved. However, due to the ever-increasing

pressure by the Allies on production centers, and the German emphasis on the "emergency fighter program," the JU-287 never progressed beyond the development stage. Nonetheless, those who prefer to build models of unusual designs should find the JU-287 a perfect stablemate to the HE-111Z. (See "Germany's Siamese Twin," February 1970 AAM.)

Construction

To build the model, four kits are needed. One MPC/Airfix HE-177, one Revell Air Power B-47, and two Lindberg AR-234 kits. While the HE-177 and B-47 can be found in the better hobby shops, the only place we know that regularly stocks the AR-234 is The Squadron Shop, 23500 John R., Hazel Park, Mich. 48030.

After assembling the HE-177 fuselage in the normal fashion, cement the bomb bay doors in the closed position. The kit provides alternate doors, and the ones you want *do not* have the bulge, so the fuselage belly contour is straight. At this point, cut off the aft fuselage at a point $\frac{3}{16}$ " behind the rear bomb bay bulkhead and true up the cut with a sanding block. Cut off the wing root stubs and plug the resulting hole with scrap plastic and body putty, Green Stuff and/or fiberglass. Sand this area down to match the fuselage contours.

A new aft fuselage can be made from balsa, white pine or basswood. Or you can do it our way. A master pattern was carved and Silastic Rubber poured over it to form a mold. When the mold cured, a plastic rear fuselage was cast

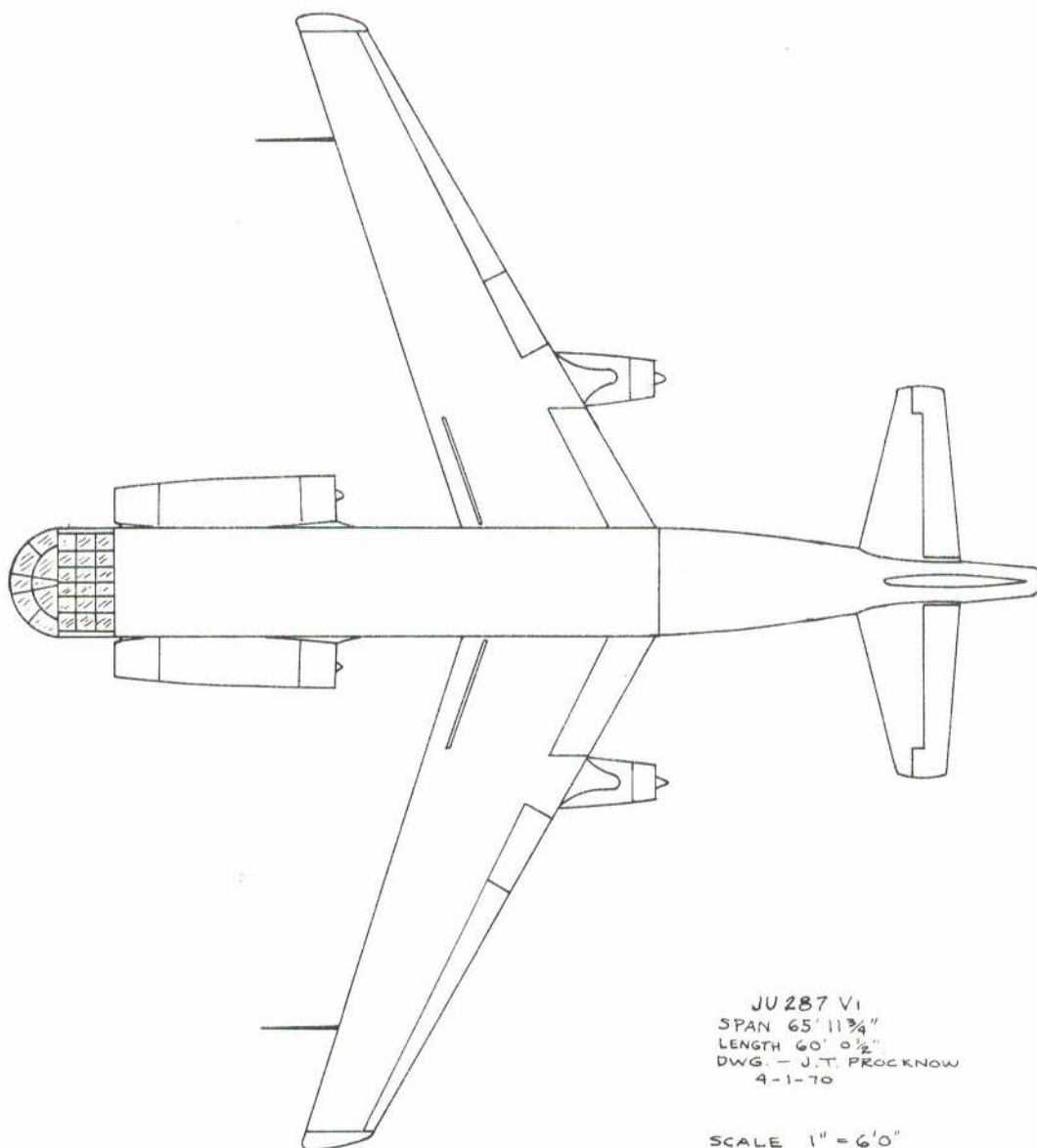
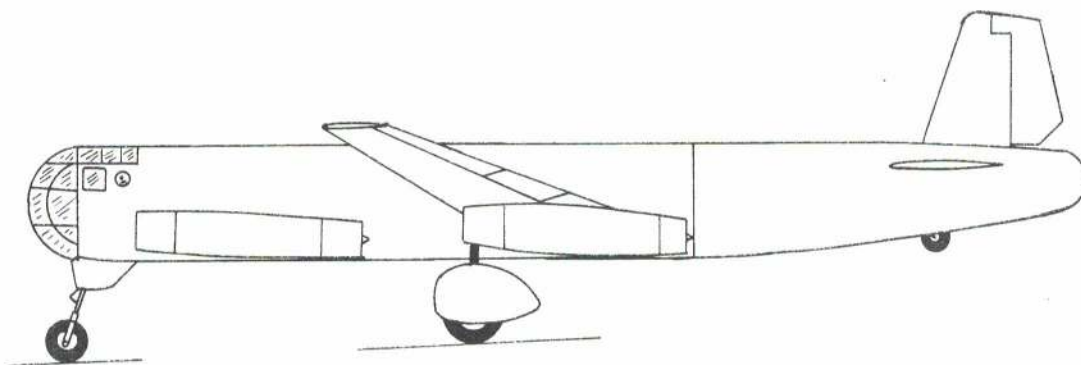
using an epoxy resin. The same process was used to mold the main landing gear pants. If you would like a copy of these parts, they can be furnished at a cost of \$1.50, including postage. Mail a check or money order made out to Jene Procknow, P. O. Box 21022, Benbrook, Tex. 76126. Since these parts are not molded from styrene, a good epoxy—such as Duro quick-set epoxy—will be needed to bond the pieces.

Moving on to the canopy, it will be necessary to fill the lower edges in order to raise the top of the canopy to a straight-line profile. Also, note that the lowest two windows are deleted and replaced with a rectangular window and circular blister. The $\frac{3}{16} \times \frac{1}{4}$ " rectangular window was made from the clear plastic of an old Scotch tape dispenser. Rounding off and polishing a piece of clear plastic sprue will give you the small blister, which is centered $\frac{1}{8}$ " aft of the side windows. Finally, the bulge beneath the fuselage nose is removed and filled with scrap plastic and putty. When thoroughly dry, sand down to match the fuselage contour.

The scrap box provided tail surfaces from an old JU-88 kit. By slightly squaring off the tips, you have the JU-287 stabilizers. The vertical stabilizer from the Revell B-47, filed and sanded to the correct profile, will give you the vertical for the JU-287.

Taking the wings from Revell's B-47, adaption to the JU-287 is started by cutting off the wing root so the leading edge of the wing sweeps forward 20 degrees.

(Continued on page 77)



JU 287 V1
 SPAN 65' 11 $\frac{3}{4}$ "
 LENGTH 60' 0 $\frac{1}{2}$ "
 DWG. - J.T. PROCKNOW
 4-1-70

SCALE 1" = 6'0"

MOUNTING TENSION?



UNWIND WITH ROYAL
the accessories that
MOUNT EASIER AND COST LESS!

Royal miniature wheels

Featuring a machined aluminum hub, these slim line, semi-pneumatic wheels are ideal for small aircraft or tail wheel application.

3/4"	15c ea.
1"	25c ea.
1 1/4"	35c ea.
1 3/8"	40c ea.
1 1/2"	45c ea.
1 3/4"	55c ea.
2"	60c ea.

Royal air wheels

This light weight, 6 spoke, nylon hub wheel features 100% pure natural rubber and is semi-pneumatic in design.

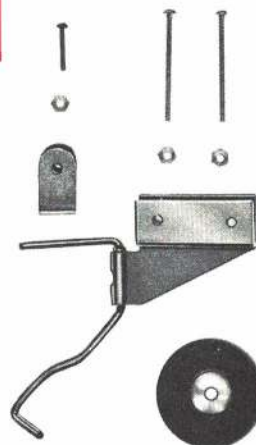
1 3/4"	\$1.99 pr.
2"	\$2.19 pr.
2 1/4"	\$2.39 pr.
2 3/8"	\$2.49 pr.
2 1/2"	\$2.59 pr.
2 3/4"	\$2.79 pr.
3"	\$2.99 pr.
3 1/8"	\$3.19 pr.



Adjustable control horn

This unique horn is completely adjustable. By simply screwing or unscrewing the nylon clevis, minute control surface settings can be obtained. Each horn comes with threaded back plate and screws.

Price 2 for 49c



Large tail wheel assembly

This assembly is complete with wheel, mounting bracket, rudder to tail wheel bracket, and all necessary mounting hardware.

Price 95c set



Small tail wheel assembly

This assembly displays the same features as our large set except it is designed for smaller aircraft.

Price 95c set



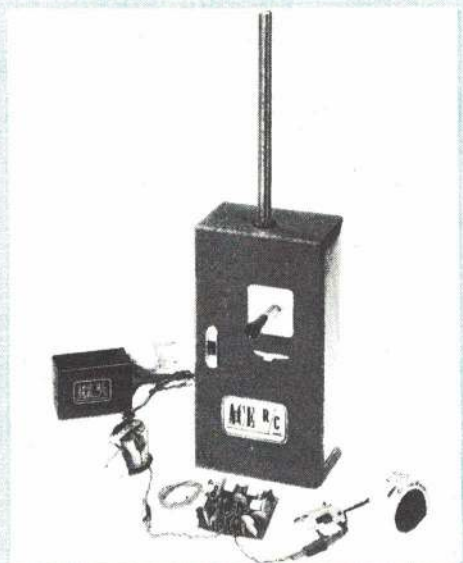
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For Your R/C Flying Fun!

commander '72

NEW CONCEPT IN PULSE RUDDER-ONLY



For 1972 the improved Commander has a Drain Brain switching arrangement in the receiver to reduce total battery drain and increase flying time from 50-80% per battery charge! Plugs are wired into the airborne unit which allows you to switch receiver from plane to plane with a minimum of effort. COMPLETE Flite Pak weights, including nicads, run from 2.5 to 4.8 oz. Transmitter has increased output to overcome interference.

Fully Proportional—Rudder follows directly movement of your stick.

Versatile—The same receiver and transmitter can be used with airplanes from 18-72" span.

Interchangeable—Plug-in wiring allows switching of receiver from plane to plane.

Lightest—Weights 2.5 to 4.8 oz. include Nicad batteries and are TOTAL weights.

Simple—Easy installation; actuator has only one moving part. Minimum maintenance.

Inexpensive—Initial cost of system, airplane and engine is low; nickel cadmium airborne pack and charger are included; transmitter and receiver can be used for many different planes.

COMMANDER '72 R-O SYSTEMS

Completely wired and tested, with transmitter, receiver, actuator, nicad battery, airborne pack and charger, switch and connectors. Transmitter battery not furnished.

10G15—Baby System '72	\$69.95
10G15T—Baby Twin System '72	\$72.95
10G16—Standard System '72	\$71.95
10G17—Stomper System '72	\$74.95
26.995, 27.045, 27.095, 27.145,	27.195
Please Specify Frequency	

R-O PULSE HANDBOOK with UP-TO-DATE CATALOG

Only \$1.00 (Refundable)

New catalog is completely updated. Includes many items from major manufacturers. Handbook has expanded data on How Pulse Works, Installation, How to Fly, and much more. Most complete information on Pulse Rudder Only available anywhere.

Price is \$1.00 via THIRD CLASS BULK MAIL. Refundable on first order over \$10.00. If you wish faster delivery, add 50¢ for FIRST CLASS.

ACE RADIO CONTROL, INC. * BOX 301 * HIGGINSVILLE, MO. 64037

NAME _____				
ADDRESS _____				
CITY _____	STATE _____ ZIP _____			
QUANTITY	STOCK #	NAME OF ITEM	PRICE	TOTAL

Master Charge or BankAmericard No.

Add \$1.00 shipping-handling for direct mailorders except catalog

ACTUATOR/BATTERY COMBOS

Here is what makes the '72 Commander so versatile. All you need to put in plane for extra installations. With connectors, so you just plug in receiver.

15K15—Baby/225 ma Batt.	\$11.95
15K15T—Baby Twin/225 ma Batt.	\$14.95
15K16—Standard/500 ma Batt.	\$13.95
15K17—Stomper/500 ma Batt.	\$16.95

FLITE PAK WEIGHTS & RECOMMENDATIONS

Complete weight of each unit and suggested application:

Unit	Weight	Recommended
Baby	2.5 oz.	Pee Wee .020 Up to 48" gliders
Baby Twin	2.7 oz.	Tee Dee .010-.020 Up to 72" gliders
Standard	4.4 oz.	.049 to .10
Stomper	4.8 oz.	Tee Dee .049-.23

ACE MINI FOAM WINGS

These jobs are being used by more and more modelers to come up with their own designs. See recent issue of AAM for P38 and RCM for Mr. Mulligan. Ideal for 1/2A Racing and other planes of semi-scale or fun types.

Constant chord measures 35" span, 5 1/2" wide, area 192.5. Weighs 3+ ounces.

Taper section is 35" span, center 5 1/2", which tapers to 4"; area 166.25. Just over 2 ounces.

13L166—Ace Mini Foam Taper Wing	\$2.95
13L192—Ace Mini Foam Constant Wing	\$2.95



DICK'S DREAM KIT

Highly Recommended for Beginners

- † 34" Foam Wing—Moulded sections
- † Top grade die-cut wood parts
- † For .020 engines
- † Commander Baby or Baby Twin
- * Owen Kampen design

No. 13L100—Dick's Dream Kit \$6.95



ACE HIGH GLIDER KIT

- † 70" Foam Wing—Moulded sections
- † Precision Machine cut and sanded wood
- † For .049—Power Pod parts supplied
- † Recommended for Rudder-Only
- Standard or Stomper Commander
- * Owen Kampen design

No. 13L104—Ace High Glider Kit \$14.95



SKAMPY KIT

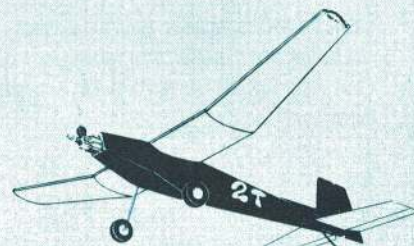
If you have mastered Rudder-Only pulse proportional flying, and are looking for new ventures, the Skampy is for you. Resembles a stand-off Goodyear Scale Racer. Owen Kampen touches in both the design and kit assures the experienced modeller of a satisfactory RO pulse experience. It is NOT recommended for beginners.

Has 30" span wing cut from Ace mini foam tapers. Construction of the fuselage is a bit harder than a box type, but still simple for modellers with experience. Fuselage is 2 3/4", recommended power is Tee Dee .020. Recommended radio installation is Commander Baby Twin. This makes total weight of 12 to 13 oz.

Kit contains taper foam wing set, precision band sawed and sanded top grade balsa and hardwood parts. Bent landing gear, wire for torque rod and plastic bearing, and hinge material is also supplied. Wheels and engine mounting hardware not included.

Full step by step instructions make this a simple job for the experienced RO flyer.

No. 13L103—Skampy Foam Wing Airplane Kit \$6.95



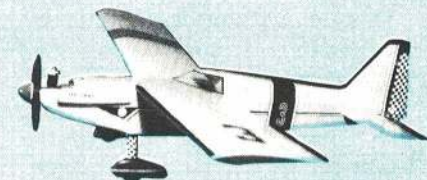
2T KIT By Ron Jacobsen

Uses two sections of the Ace Mini Foam Taper Wings, and one Constant Chord section for a total span of 50 inches, 262 sq. in. Coupled with an .049, the 2T was designed primarily for the two channel Brick type digital that are on the market, or two servos of any digital system.

Also, when constructed correctly, it performs exceptionally well on Rudder Only using the Commander Standard or Stomper. Motor control can be added to at a later date by using the KRD motor control.

Kit contains three wing panels, all balsa wood completely band sawed and precision sanded, bent landing gear, and miscellaneous parts. Is of the same general high caliber as previous Ace kits. Hardware for hinges and linkage and wheels is left to the buyer.

No. 13L106—2T Foam Wing Airplane Kit 14.75
No. 13L206—Three Foam Wing Sections 5.00
For 2T



UPSTART 1/2A RACER KIT

- † Midget Racing Just For Fun!
- † 34" span, 6" chord, 200 sq. in. foam wing
- † Top grade band sawed wood
- † .049 to .051 Tee Dee Engine
- † Two channel operation
- * Owen Kampen design

No. 13L102—Upstart Custom Kit \$10.95



digital commander

As Presented In AMERICAN AIRCRAFT MODELER April, May, June, July 1972

By Fred M. Marks

- * Two channel system using IC's and latest state of the art; may be expanded to 4 channel.
- * Receiver-Decoder will work with ANY modern 4-6-8 channel digital transmitter on same frequency! Reads aileron and elevator signals—ignores the rest.
- * Receiver-Decoder works any modern digital servo.
- * Receiver-Decoder offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
- * At present available only on 27 mHz frequencies.

Ace R/C is offering complete kits of all units and combos, as well as PC boards and individual components.

digital commander FLITE PAK KIT COMBO

If you intend to use Commander Digital with your multi digital transmitter, all you need are the receiver-decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for cabling. Everything you need to make complete 2 channel-2 servo pack for your sailplane, boat or car, except batteries.

No. 12G30—Flight Pak Combo \$69.95
(Please specify frequency)

digital commander RECEIVER-DECODER KIT

IC's simplify wiring and set up of 2 channel decoder. Receiver is conventional double tuned front end using discrete components. Complete with detailed step by step instructions.

No. 12G20—Digital Commander Receiver-Decoder Kit \$27.95
(Please specify frequency)

Available separately--

RECEIVER

1	18K41	10 mf	6v	Tantalum	.90
2	"	47 mf	6v	" @ .90	1.80
2	"	15 mf	6v	" @ .90	1.80
1	18K38	.05 mf		" @ .25	2.75
3	18K9	.001 mf		" @ .20	.60
1	"	.01 mf		"	.20
1	18K7	.47 pf	NPO		.25
1	"	15 pf	NPO		.25
1	"	1.5 pf	NPO		.25
1	"	18 pf	NPO		.25
1	"	3.3 pf	NPO		.25
1	29K20	1/4 w	22k		.15
1	"		3.3k		.15
1	"		470		.15
1	"		10k	@ .15	.75
1	"		2.7k		.15
1	"		1k	@ .15	1.35
2	"		4.7k	@ .15	.30
1	"		100k		.15
1	"		100		.15
2	"		220	@ .15	.30
1	MPS3646		Motorola		.70
3	MPS3563		"	@ .50	1.50
2	2N4124		"	@ .50	1.00
1	1N4148		"		.35
1	17K54		Mitsumi IF (Yellow)		1.60
1	17K55		" (white)		1.60
1	17K56		" (black)		1.60
2	Wound coils		@ 1.20		2.40
1	17K31		3.7 mHz choke, tapped		.60
1	Receiver crystal (select to match Tx)				4.25
1	Step by step Construction Manual				1.00
1	28K21		Receiver PC base, etched and drilled		1.75

DECODER--2 CHANNEL

1	18K41	.068 mf	6v	Tantalum	.90
1	"	3.3 mf	6v	"	.90
1	"	1.5 mf	6v	"	.90
1	"	47 mf	6v	"	.90

1	18K38	.05			.25
1	29K20	1/4 w	33k		.15
1	1N4148		Motorola		.35
1	SN7404		" IC		.96
1	SN74L73N		" IC		2.95
1	28K22		Decoder PC base, etched and drilled		1.50
1	Step by step Construction Manual				1.00
1	28K22		Decoder PC base, etched and drilled		1.50
No. 19L50			Deans gold plated 4 pin connector set		.95
No. 40L252			CW DPDT Slide Switch		.59
No. 30L21			Switch Guard for above		.39
No. 21K30			Aluminum case for Commander Digital Receiver-Decoder		2.00

digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

No. 14G20—Digital Commander Servo Kit \$25.95

Available separately--

3	18K41	4.7 mf	6v	Tantalum @ .90	2.70
1	"	2.2 mf	12v	"	.90
1	"	.56 mf	12v	"	.90
1	18K11	.22	Erie Square Redcap	@ .15	.85
3	29K20	1/4 w	47k		.45
1	"		22k		.15
1	"		3.3k		.15
2	"		150	@ .15	.30
1	"		100k		.15
1	29K21	1/8 w	120k		.25
1	WE 3141		IC World Engines		5.95
1	28K22		Servo PC base, etched and drilled		.95
No. 14K30			D & R Bantam Servo Mechanics		5.95
No. 23K5			11 ohm, 16 mm Motor		5.95
No. 29K40			5k hard ceramic pot element with wiper		1.75
			Step by step Construction Manual		1.00

BATTERY & CHARGER OPTIONS

While alkaline energizers may be used for Flite Pak, Nicads are recommended--4.8 volts.

38K33	Nicad 225 ma Cylindrical cells	2.00
38K50	KRD Flat Pack for above (4)	1.00
38K35	Nicad 450 ma Cylindrical cells	2.50
38K8	D & R Square Pack for above	1.95
38K77	XL-ent 4.8v 500 ma button pak	8.95
34L10	XL-ent 225 ma charger kit	3.95
34L11	XL-ent 500 ma charger kit	3.95
34K22	Varicharger kit	7.95
34K21	Varicharger, assembled (Varicharger will charge both 225 and 500 ma and other packs)	9.95
No. 38K54	Mallory 1603, 9 volt Transmitter Battery	2.25

digital commander TRANSMITTER KIT

IC's make the encoder a cinch, and easy conversion later to 4 channel. Built up to a standard of excellence; not down to meet a price. Complete kit with step by step instructions.

No. 11G20—Digital Commander 2 Channel Kit \$49.95
(Please specify frequency)

Available separately--

3	18K41	1 mf	6v	Tantalum @ .90	2.70
1	18K42	47 mf	20v	"	1.20
1	18K16		Arco 423 Trimmer		.55
1	18K9	.02 mf	12v		.20
3	"	.001 mf	12v	@ .20	.60
4	"	.01 mf	12v	@ .20	.80
3	18K38	.05 mf	12v	@ .20	.75
1	18K7	33 pf	NPO		.25
1	"	100 pf	NPO		.25
1	29K20	1/4 w	47		.15
2	"		470	@ .15	.30
1	"		10k		.15
5	"		4.7k	@ .15	.75
2	"		1k	@ .15	.30
1	"		82k		.15
2	"		2.7k	@ .15	.30
1	"		390		.15
1	"		560		.15
1	"		330		.15
1	"		100		.15
2	"		10	@ .15	.30
1	2N4871		Motorola		.90
1	MPS3646		"		.70
2	MPS6534		"	@ .90	1.80
3	MPS6531		" or EN708	@ .80	2.40
1	1N283		"		.40
1	1N5225		"		.90
2	MC717P		Motorola IC	@ 2.10	4.20
1	MC885P		" IC		.96
1	Wound air core coil				.60
1	Wound iron core coil				1.10
1	17K21	22 mHz	Swanson RF		.50
3	17K7	10 mHz	"	@ .50	1.50
1	Transmitter crystal				2.95
1	15K64		Ace-Rand Stick Kit		9.95
2	29K42		CTS Stick Pots	@ 2.00	4.00
1	28K24		Transmitter PC base, etched and drilled		4.25
1	37K85		Center loaded antenna with mount		6.95
1	21K19		Vinyl Olive Grey case punched		4.95
1	40L252		CW DPDT Switch		.55
1	30L21		Switch Guard		.39
1	Step by step Construction Manual				1.00

COMPLETE KIT COMBO

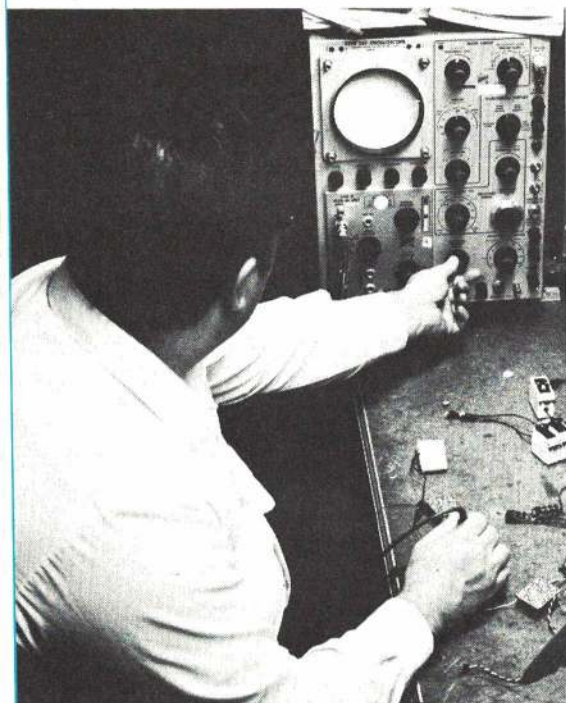
Consists of Transmitter Kit, and all parts of the Flite Pak Combination and saves still more. Available initially on 27 mHz spots.

No. 10G2—Digital Commander Kit Combo \$117.95
(Please specify frequency)

Serving R/C
Since 1953

AAM Commander

PART III IN A SERIES



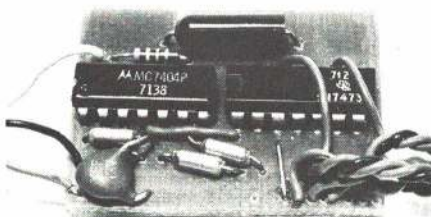
by FRED MARKS

During the preceding two issues we have covered the system in general, presented the parts lists, p.c. layouts, and instructions for construction of the transmitter and servo. This issue will contain instructions for assembly of the receiver and decoder plus the design information for them. At this point, sufficient information will have been provided to build a complete two-channel system. The final article of this four-part series will provide complete integration procedures, show how parts of the system may be used with other systems, provide trouble-shooting procedures, and indicate changes required for other applications.

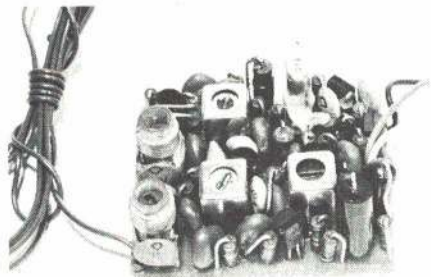
Receiver Design

Please refer to the preceding issue for the description of digital system function to be followed here.

Achieving a good solid receiver design was the most difficult task of this project. (My "Where The Action Is" column in the May 1972 issue gives some indication of the difficulties encountered.) Initial attempts to convert the ACE Micro Gem by adding AGC were not successful; the receiver refused



(1)



(2)

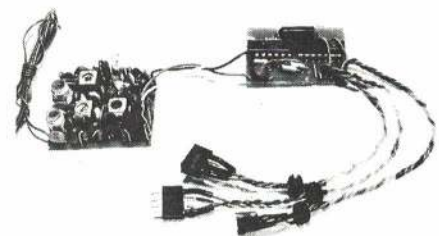


(3)



(4)

(5)



(1) Decoder board uses dual in-line IC package. Rugged, with low parts count. Note positioning of disc capacitor. A recommended approach for switch harness will be shown next issue. (2) Receiver layout contains double tuned front end, local oscillator, IF strip, some pulse amplification and squaring. Only component values change for use on 50-54 and 72 MHz bands. (3) One of the test aircraft. Ten pilot systems were built and all were test flown including one set on 53.2 MHz. (4) An excellent case may be constructed for the receiver/decoder from ABS plastic scrap from ARF airplanes. Metal case may be used but will necessitate retuning of receiver L2 and L3/L4 after installation in case. (5) Receiver/decoder connect via three wires. Always route the receiver antenna away from power leads.

space used to provide good stability. The receiver is stable and tuning is easy and solid.

Refer to the block diagram, Figure 1, and schematic, Figure 2, for the discussion to follow. The RF tuning, i.e., front end, uses two parallel pass filters (L2, C5) and (L3, C7) which are coupled by C6. This double tuned circuit provides the proper front end selectivity even when an adjacent channel transmitter is close by. The front end components are C5, L2, C6, L3, and L4.

The output from the secondary winding L4 of L3/L4 is fed directly to the base of the mixer, Q1, which is biased to a given d.c. level via R5 and R6. The output from the local oscillator is injected at the base of Q1.

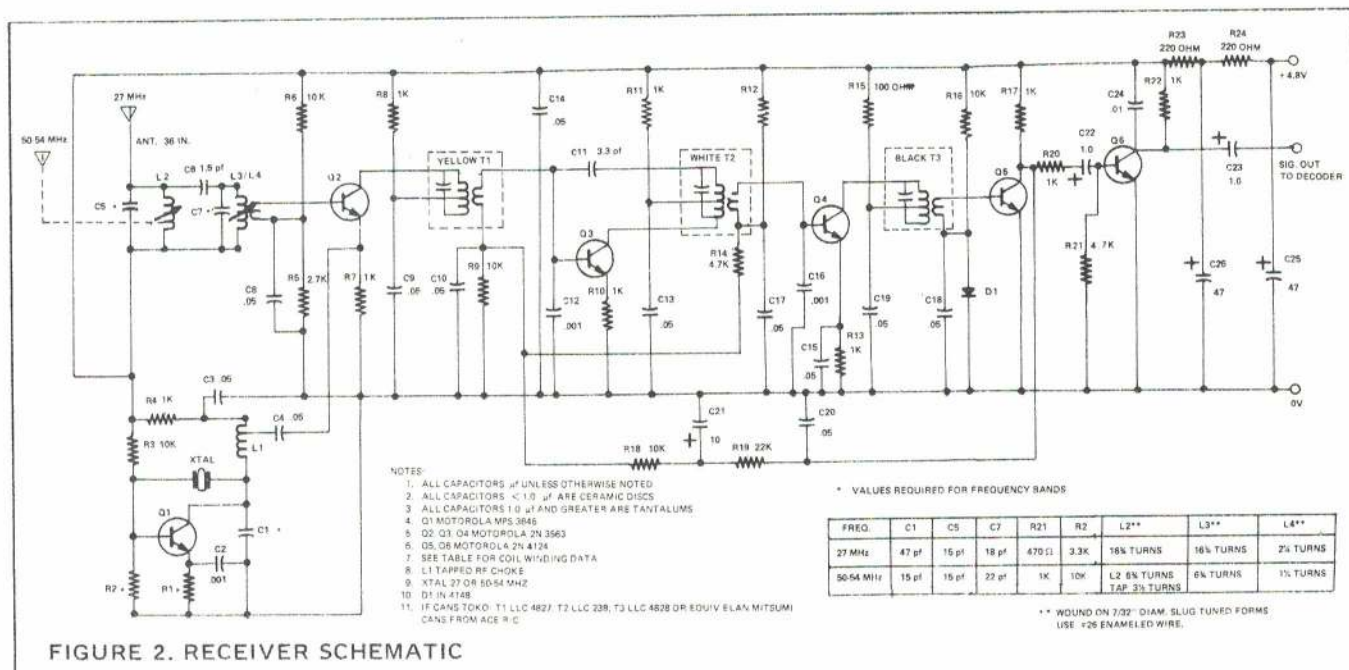
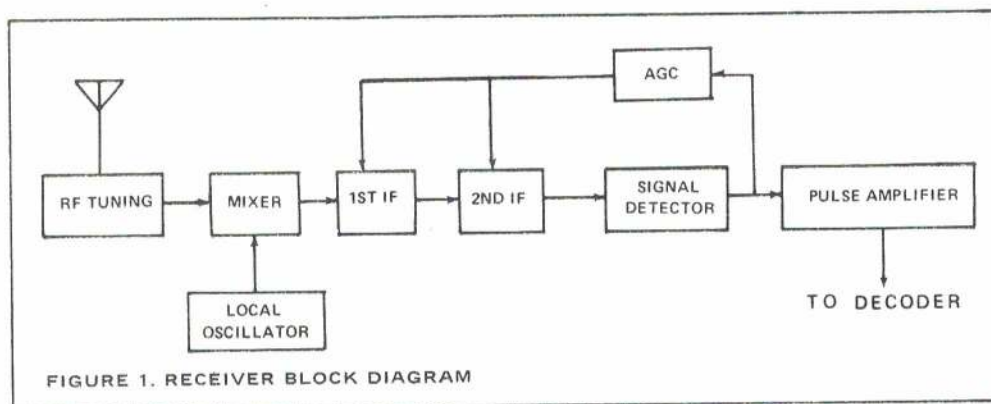
The local oscillator usually operates at a frequency 455kHz below the transmitted frequency. However, some crystals are ground to be 455kHz above the transmitted frequency—it makes no difference so long as the difference is 455kHz. The local oscillator (LO) used is a crystal controlled oscillator feeding a tapped inductor. The shorter winding

to pass digital signals without distortion.

We then tried a receiver submitted to us by another modeler and built around the IF section used in the Kraft receiver plus the use of a FET mixer based on circuitry used by Royal Electronics. While this receiver performs quite well, the use of the FET front end reduced overall gain to the point that IF transistor loading had to be reduced to the absolute minimum. In addition, there was no margin for decoupling, i.e., insertion of resistance between the decoder and receiver, in conjunction with filter capacitors, to keep servo noise out of the receiver. Consequently, alkaline energizers could not be used to power the airborne unit.

Meanwhile, approximately six other approaches to the receiver were analyzed leading to that selected here. Parts count is a little higher than wished, however it pays off in performance margin.

This is a superheterodyne receiver utilizing a double tuned front end. The use of an IC to perform squaring and pulse stretching on the decoder permits the receiver to be simplified and the



above the tap forms a secondary as well as part of the total inductor. The output of the L0 is coupled via C4 to the emitter of Q1.

Two frequencies appear at the input to Q1—the transmitted frequency and a frequency separated 455kHz from the transmitted frequency. For example, assume a transmitted frequency of 26.995 MHz. The L0 operates at 26.995 MHz minus 0.455 MHz or 26.540 MHz. The function of Q1 is to "mix" these frequencies to produce a 455kHz intermediate frequency (IF). When two separate frequencies are mixed or "heterodyned," they produce the following frequencies, for our example: (a) The sum of the two frequencies of 53.835MHz; (b) The difference between the two frequencies or 455kHz; (c) As one would suspect, the two original frequencies. In order to provide the desired selectivity, we wish to work only with the 455kHz IF frequency. This is the function of the IF strip to be described later. The local oscillator is formed of R1, R2, R3, R4, C3, L1, C1, C2, Q1 and the crystal. C4 is the coupling interface with the mixer formed of R5, C8, L4, Q2, R6 and R7.

The IF strip is a series of inductive/capacitive filters which pass the 455kHz signal out of Q2 and exclude all the other frequencies, ideally. By so doing, it increases the selectivity of the receiver to 5kHz as desired. The output from T3 is rectified by D1 and the output from Q5 appears as the rectified 455kHz envelope. This means that the base of Q5 sees only the positive going portion of the IF envelope which occurs when a pulse is received in the RF envelope. Q5 amplifies the pulses to an amplitude which is dependent on the signal input to the receiver, i.e., amplitude increases as signal strength increases. One can visualize that the output amplitude of Q5 would fluctuate continually as range and aspect to the transmitter changes. This is highly undesirable as it results in glitching and/or swamping of the receiver.

The above is prevented by coupling back the detected D.C. signal out of Q5 to the preceding IF stages to reduce their gain as signal input is increased. Ideally, then, the output from Q5 remains constant from zero range to the maximum anticipated operating range.

Within the limits of simple circuitry this is the case. This function is called automatic gain control (AGC). The AGC circuit is formed by C20, C21, R14, R18, and R19. All the remaining circuitry between the output of Q2 and the output of T3 constitutes the IF circuitry (commonly called the IF strip).

The output from Q5 is coupled to an additional stage of amplification via R20 and C22. Q6 and its associated loading and shaping components C24 and R22 amplify and square the output pulses which are then coupled to the decoder via C23.

R23, R24, C25 and C26 form a passive filter to remove fluctuations from the D.C. supply to the receiver. The resistors provide "decoupling" from the supply and the capacitors attempt to maintain the voltage constant. This is quite necessary for use with the World Engines IC used in the servo amplifiers due to the extremely sharp switching pulses they introduce into the power supply.

The two decoupling resistors and the loading resistors for Q3 and Q4, R10 and R13 play an important role in re-

LONG RANGE RECEIVER AND VERSATILE IC DECODER PRESENTED THIS MONTH.

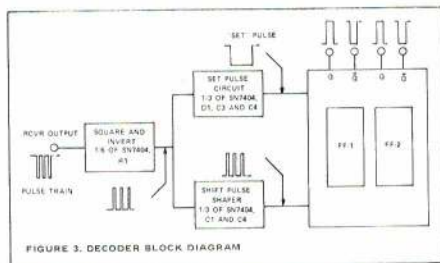


FIGURE 3. DECODER BLOCK DIAGRAM

ceiver design. As previously mentioned, if a receiver hasn't enough gain to permit decoupling, then filtering will be minimal. Providing the margin of design indicated (instructions for receiver "trimming" are provided) gives the builder a chance to optimize the receiver to his particular use. One may desire to operate the system on 3.6 volts for moderate range and extremely light weight, in which case R10 and R13 could be reduced to as low as 820 ohms. These must not be changed indiscriminately, but do permit a latitude in system supply voltage. The voltage actually present at the junction of C24 and R23 is 3.5 volts when a 4.8 volt supply is used. By providing a regulator, which adds complexity, an even more stable receiver could be created and even greater leeway permitted. However, I didn't feel that this was justified in terms of our goal of simplicity.

The changes to the design for operation on 50-54MHz are minimal and are indicated on the schematic.

Decoder Design

The two channel decoder is based on the use of transistor-transistor logic (TTL) integrated circuits offering the utmost in stability and reliability. The decoder is just about as simple as possible. There are two IC's five capacitors, one resistor, and one diode.

The decoder is shown functionally in the block diagram, Figure 3, and in the schematic, Figure 4. The description which follows is keyed to these two figures. The hexagon inverter SN7404 consists of six separate transistors with integral biasing and loading resistors contained in the chip. Digital information operates between two levels, i.e., it is binary. These voltage levels are usually slightly above zero volts and slightly below 4.8 volts for the decoder. An inverter will show the opposite output from the input.

Let us examine the function of Inverter No. 1 in the diagram, as an example. The receiver output is a train of three pulses per frame with an upper level near 4.8v. Each pulse drops to near zero volts. The inverters in the SN-7404 will switch at these levels, thus the first stage shown inverts and slightly amplifies the pulse train.

The pulse train now proceeds to two separate stages—the one at the top (Inverters 4 and 5) of both the block diagram and schematic generate the "set" pulse, and the lower one (Inverters 2 and 3) shapes and squares the pulse train to form clock or "shift" pulses.

The shift pulse shaper accepts the pulse train, squares, and stretches it slightly by feeding back via C1. Capacitor C2 provides better stability. The output from Inverter No. 2 is negative but is reinverted by No. 3 to remain positive at the output. The shaped clock pulses then are passed to the dual J-K flip-flop, the SN74L73.

Upon receipt of the first, or "synchronization" pulse, the diode and C3 act as an integrator or pulse stretcher. C3 discharges through Inverter No. 4 and places it in an inverted positive-going state. The output Inverter No. 4 is still slightly rounded and is of the wrong level, i.e., positive going, so further stretching is provided by C4. The output from Inverter No. 5 is quite square and is negative-going during the period when the pulse train is present.

The dual J-K flip-flop actually performs the decoding function. The "shift" and "set" pulses are used to control the flip-flops. The SN74L73 (the L means "low drain") contains two completely independent flip-flops except for power supply inputs. They have interconnected via the p.c. board to function serially.

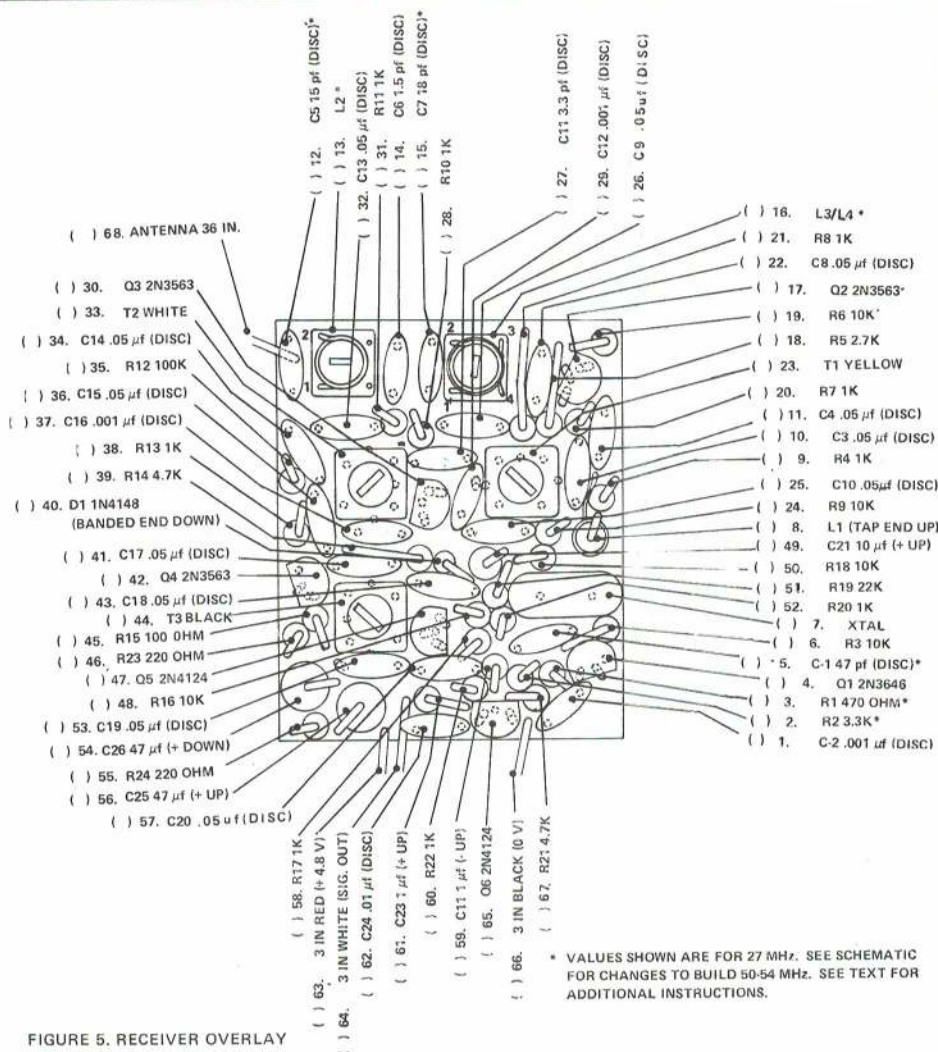


FIGURE 5. RECEIVER OVERLAY

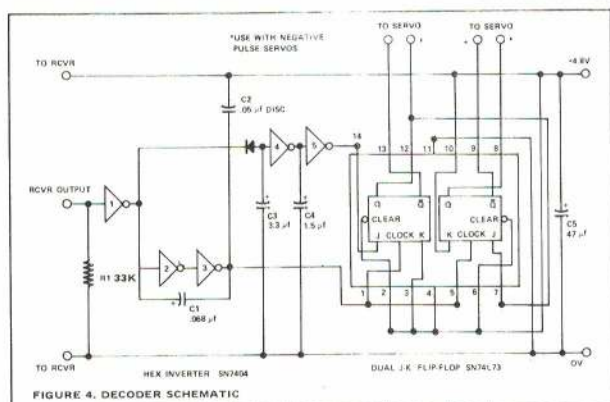


FIGURE 4. DECODER SCHEMATIC

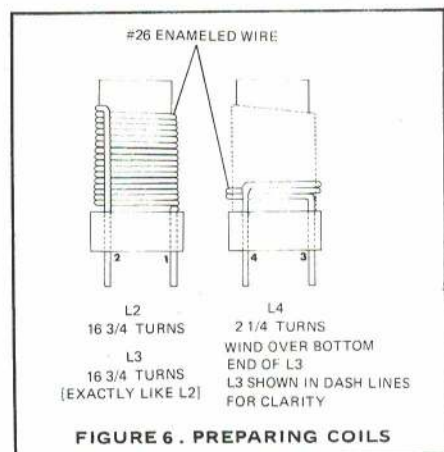


FIGURE 6. PREPARING COILS

The simplest flip-flop works as follows: It shifts its binary one (high voltage out) back and forth between Q and Q-bar each time a clock pulse is received. Whenever Q is positive (one), Q-bar is negative (zero) and vice versa. By adding a bit more sophistication, additional control may be added to inhibit the shift or to arbitrarily "clear" the flip-flop by setting it on Q-bar. The two functions we use for control are entered at the "set" input of FF-1 (the J input) and at the clock inputs.

When there is no information present, during the synchronization pause of "set" period, Q for both FF-1 and FF-2 is zero. As soon as the first clock pulse is received, FF-1 shifts to Q, i.e., Q becomes positive and, as stated earlier, Q-bar becomes negative. FF-1 cannot shift to Q-bar unless it "sees" a one, or positive level, at J (pin 14) which it does at the instant the first clock pulse is received. Q for FF-1 remains positive until the second clock pulse is received at which time it reverts to zero.

If J for FF-1 were to remain at the one level at all times, FF-1 would shift back and forth between Q and Q-bar every time a clock pulse was received and there would be no decoding. Thus, the "set" pulse was driven to zero an instant after the first pulse was received as mentioned earlier. Now, FF-1 cannot shift

again as long as the output from Inverter No. 5 is negative, i.e., not until after all pulses have been received and the output of Inverter No. 5 returns to the one level. This is why the pause between frames is called the synchronization or "set" pause since FF-1 is "set" to accept the first pulse during this pause.

Go back and reread the preceding two paragraphs and remember the FF-2 cannot shift to Q-bar unless its J sees a one. It sees a one only when Q for FF-1 is a one, i.e., during the first control pulse. So, as soon as Q for FF-1 is a one, FF-2 is set and is free to shift to Q-bar when it receives the second pulse, which also returns FF-1 to Q. As soon as C3 and C4 have discharged after the last pulse, the output of Inverter No. 5 returns to a one and FF-1 is reset to be ready for the next frame.

The lengths of the control pulses are determined by the length of time (1.5 milliseconds \pm 0.5 milliseconds for control motion) between the clock pulses. The synchronization pause is nominally 10 milliseconds, thus the entire frame is 10 plus 1.5 plus 1.5 milliseconds or 13 milliseconds which, makes the frame rate about 75 per second.

The decoder has been tested with just about every servo available and has been found compatible with all of them,

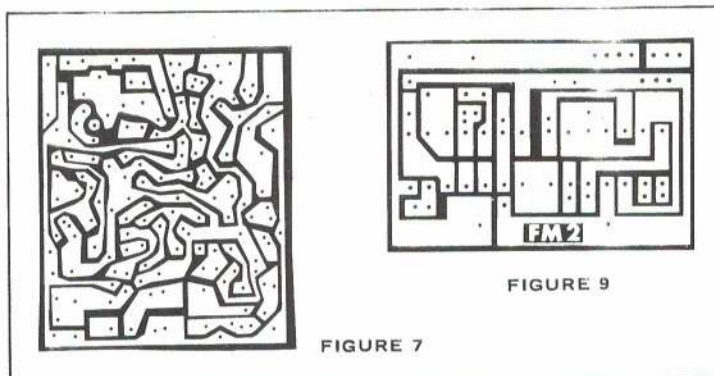


FIGURE 7

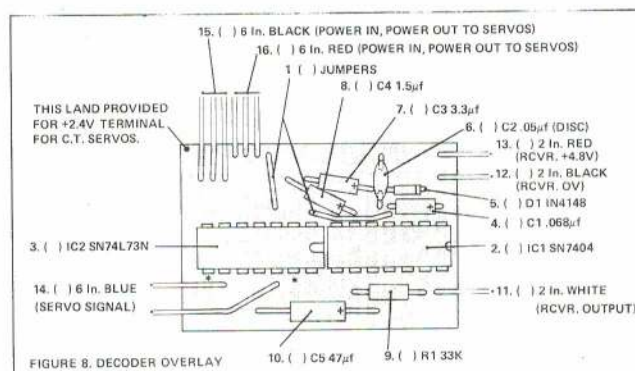


FIGURE 8. DECODER OVERLAY

including negative going servos operating from Q such as the controlaire S-4a and S-4d and the EK MM3. Reread the text on the decoding function of the dual J-K flip-flop and it will be noted that, once FF-2 has completed its cycle with the receipt of pulses two and three, either flip-flop can be shifted again until

(continued on page 79)

Corrections to the first article in this series are as follows: (1) The number of .05 mf capacitors required for the receiver is twelve, not eleven. (2) The servo requires four fifteen ohm resistors, not 150 ohm as shown on chart. (3) A 54" center loaded antenna is required for the transmitter. The antenna fitting is available from Royal Electronics. (4) Add a 24" length of SWG 22 enameled wire to the transmitter miscellaneous list. (5) The receiver coil forms are 7/32" OD, not 5/32" as shown in miscellaneous list. (6) There is one error on the transmitter p.c. print which may be readily corrected as follows: Measure up 11/16" from the lower edge and in 7/16" from the right-hand edge. It will be seen that a vertical land ties in to the large +9V buss at that point and would permit a direct short from 3.8 volts regulated. This was corrected on the pilot model art and is corrected on the film negatives from AAM Plans Service. However, the home builder who has negatives made from the magazine art should either put white tape across this point or cut the copper after the p.c. board is etched. (7) For those who wish to build an even smaller servo amplifier, there is enough leeway in board layout to permit reducing the servo p.c. by as much as five to eight percent when a negative is made.



LONG TOM

by RAY MALMSTROM

THIS NIFTY LOW-WINGER CARRIES A LONG RUBBER BAND FOR BETTER FLIGHTS. PROP AND WHEELS FROM DIME STORE PLANE ARE NEEDED.

Most model aircraft, like their full-size brethren, have fuselages shorter than the wing span, so we'll forgive you for raising an eyebrow at Long Tom. Our plane reverses the normal layout with the fuselage longer than the wing span. Actually, this is not just to be different: there is, as the aeronautical experts say rather grandly, a "design philosophy" behind it.

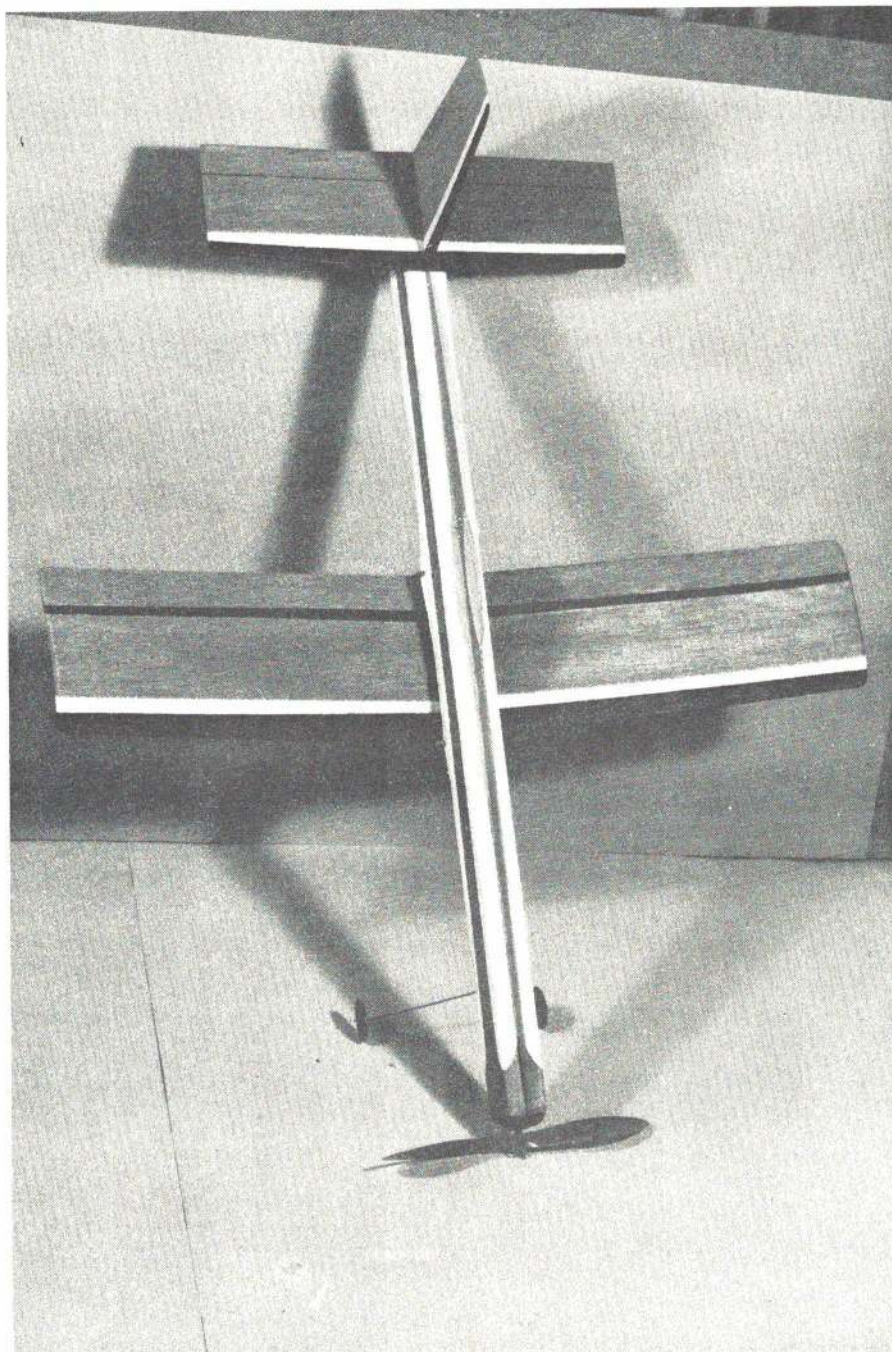
For any given number of strands in a rubber motor, the longer that motor can be, the more turns you can wind on it. The longer the fan keeps turning up front, the longer your pride and joy remains airborne. Simple.

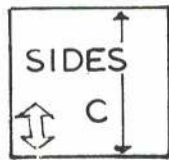
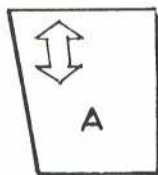
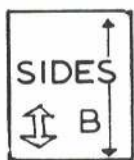
If you want to try this "design philosophy" with a simple-to-build model, let's sit down and butcher some balsa together. By the way, Long Tom gives you a bonus on the unusual—it's a low-winger.

Construction

Following the stage-by-stage construction sketches, we should be the proud possessor of Long Tom in a very short time. Commence by cutting, from a 3 x 36 x 1/16" sheet of medium grade B balsa, two fuselage sides 22" long by 1" wide. Cut the front ends to the angle shown on the plan—accuracy is important. Cement strips of 1/16" square along the top and bottom edges of the sides (Fig. 1). Add the 1/16" square crosspieces spaced two in. apart (Fig. 2). Cement in place pieces A and E; drill 3/32" dia. holes through piece E and the fuselage sides (Fig. 3). Join the two sides together with 1/16" sheet pieces B, C and D (2). Check for square assembly using a set-square. Use modeling pins to hold pieces B, C and D in place until cement has set. Then add the top and bottom 1/16" square crosspiece (Fig. 4). Cut two lengths 22 x 1" from 1/32" sheet and cover top and bottom

(Continued on page 69)





F

6.3/4" DIA.
PLASTIC
KAYSUN
PROP.

LAM.
1/8 SHT

ALUM. TUBE

FUSELAGE
SECT.

1/16 DIA.

H

CUP
WASHERS

FIN 1/16 SHT

1/16
PLY

ELEC.
TUBING

BALANCE POINT

BALL PEN
/ LINE

X
X
JOIN
TO
1X-1X

FIN.CHECK
SQUARE

RUBBER
MOTOR
ANCHORAGE
DOWEL

TAILPLANE
FIN
DETAIL

CUT

FRONT
EDGE

/WING PANEL SHEET JOIN

R1

ROOT RIB
/ ANGLED. USE JIG.L

R1.A

3/32 DIA.
DOWEL

E

R2

G 1/16 SHT

WING
CONSTRUCTION

7

JIG.L

PAPER
CLIPS

1/16 SHT.
1/8 SQ.

REAR PLUG

R3

c/L

FIN SLOT

R4

8

JIG.K

R5

WING PANELS(2) AND
TAILPLANE 1/16 SHT

1/16 SHT

SIDES
D

E

Ray Malmström. 71.

JOIN



SIG MODEL AIRPLANE

MOUNTING BOLTS

COMPLETE WITH NUTS & WASHERS

Package of 4



Round Head

2-56 x 3/8	15c
2-56 x 1/2	15c
2-56 x 1	15c
3-48 x 3/4	20c
4-40 x 3/8	20c
4-40 x 1/2	20c
4-40 x 3/4	25c
4-40 x 1	25c
4-40 x 1 1/2	25c
6-32 x 1	25c
6-32 x 1 1/2	30c
8-32 x 1-3/8	25c
8-32 x 1 1/2	30c



Flat Head

2-56 x 3/8	15c
4-40 x 3/8	20c
4-40 x 1	25c

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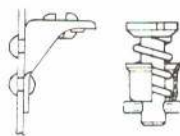
Package of 6



4-40 x 1 1/2
6-32 x 1 1/2

20c

CAMLOC WING FASTENER



\$1.29
pr.

BRASS EYELETS

1/32" I.D. (pkg of 15)
1/16" I.D. (pkg of 15)
3/32" I.D. (pkg of 12)
1/8" I.D. (pkg of 3)
Lead-Out Eyelets (pkg of 4)
Eyelet Assortment (pkg of 12)
Miniature Eyelets (pkg of 12)

15c



LOCK WASHERS

Package of 12



No. 2 15c
No. 4
No. 6

FLAT WASHERS

(METAL)



15c

No. 2 (Pkg. of 12)
No. 3 (Pkg. of 12)
No. 4 (Pkg. of 12)
1/8" I.D. (Pkg. of 10)
3/16" I.D. (Pkg. of 6)

ROD COUPLERS

Package of 4



15c

J-BOLTS (4-40)

COMPLETE WITH WASHERS & NUTS



PKG. OF 4

25c

SPADE BOLTS

COMPLETE WITH WASHERS & NUTS

PKG. OF 4 (6-32)

25c



BLIND MOUNTING NUTS



2-56

3-48

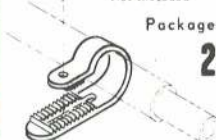
4-40

6-32

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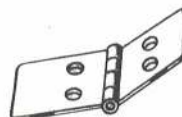
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MOLDED NYLON



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Pkg. of 1

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6-32 x 1 Pkg. of 4	55c
8-32 x 1 1/4 Pkg. of 4	59c

Complete with wrench and nuts and washers

4-40 x 3/4 Pkg. of 4	55c
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8-32 x 1 1/4 Pkg. of 4	65c

NYLON BUSHINGS

Package of 3



NO. 4 15c
NO. 6
NO. 8

NYLON WASHERS



15c

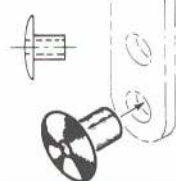
3/32 I.D. WASHERS.....Pkg. of 8
1/8 I.D. WASHERS.....Pkg. of 8
5/32 I.D. WASHERS.....Pkg. of 8
3/16 I.D. WASHERS.....Pkg. of 6

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FOR BUSHING OF THROTTLE ARMS AND CONTROL HORNS

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25c



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FOR MOUNTING ENGINES TO WOOD ENGINE MOUNTS

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No. 2 x 1/2"
No. 4 x 3/8"
No. 4 x 1/2"
No. 6 x 3/4"



20c

Pkg.

THREADED HARD WOOD BLOCKS



8 - 32

1/4 - 20

25c

Pr.

WING SCREWS

Package of 4

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4-40 x 1	25c
8-32 x 1	35c
1/4-20 x 1	39c
1/4-20 x 1 1/2	49c



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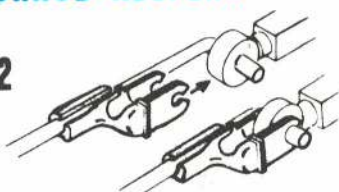


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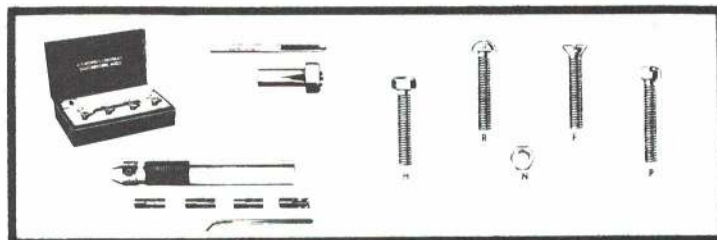
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1-72 x 1/4".....35
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0-80 x 1/2".....45
1-72 x 1/2".....45

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1-72 x 1/8".....30
00-90 x 1/4".....35
0-80 x 1/4".....35
1-72 x 1/4".....35
00-90 x 1/2".....60
0-80 x 1/2".....45
1-72 x 1/2".....45

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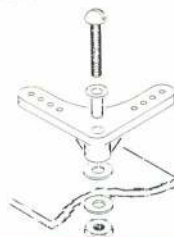
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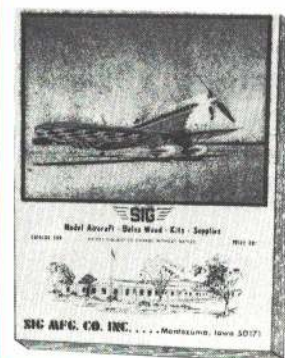
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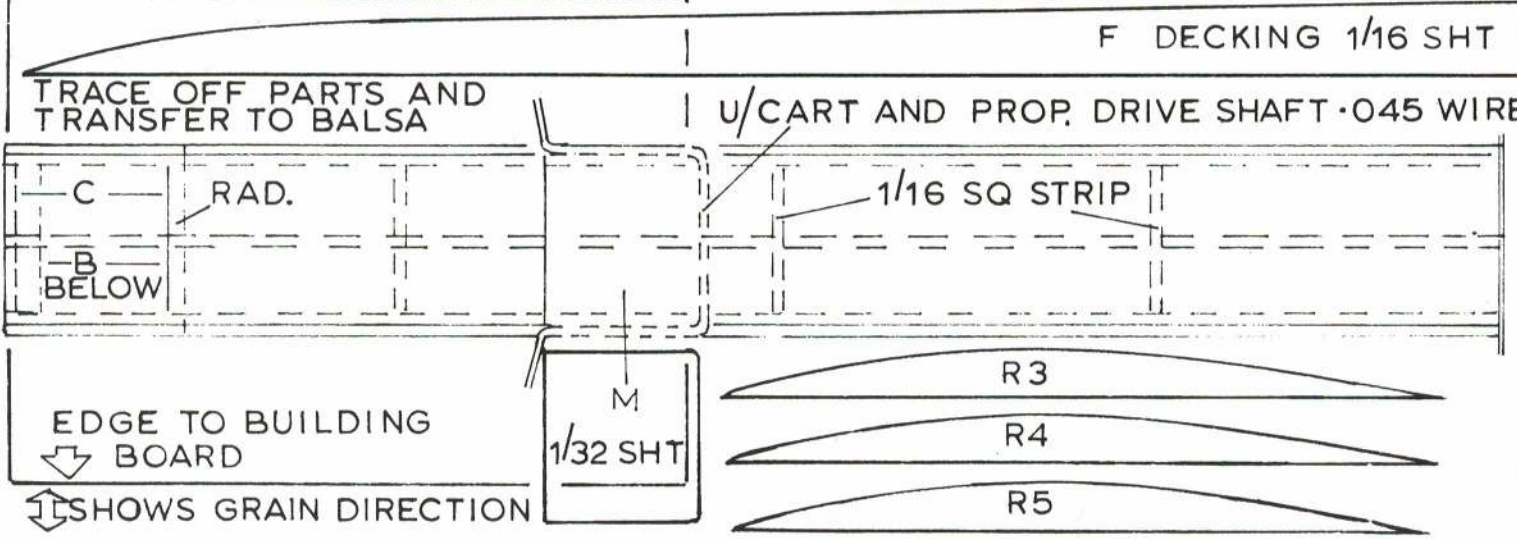
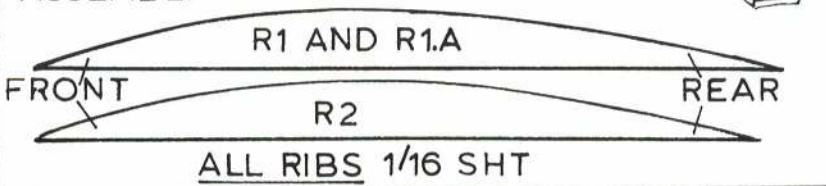
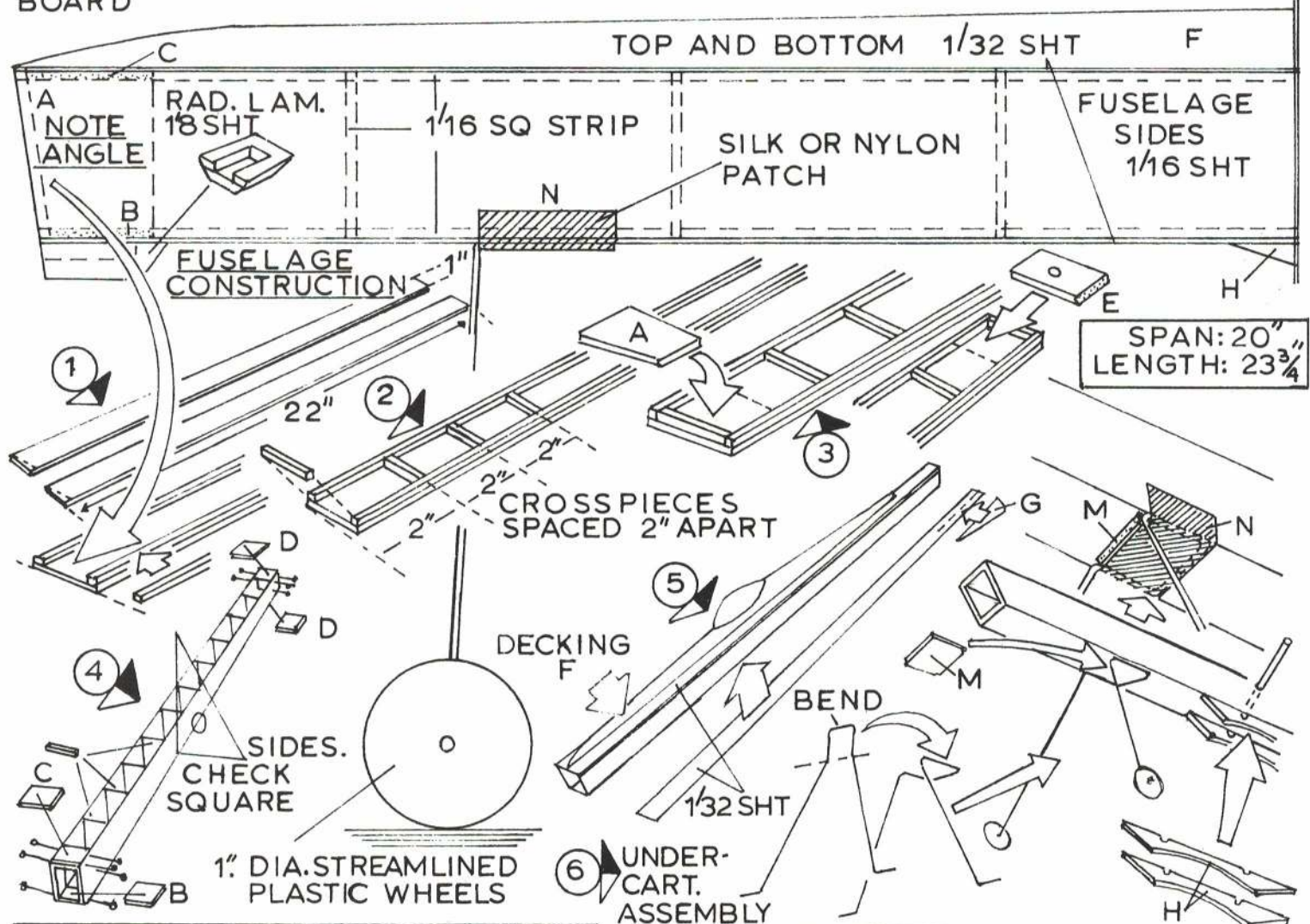
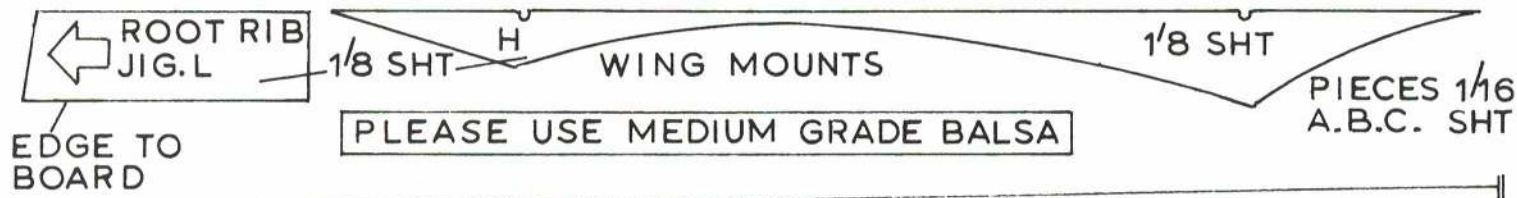
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Print your name and address plainly. Sorry, No C.O.D. ship-
ments. All prices subject to change without notice.



Perfect Finish with A Brush?

(continued from page 31)

with No. 280 wet/dry used quite wet. This combination will cut the filler very rapidly. As soon as you start to see the wood reappear, switch to No. 400 and continue to sand until very little filler is visible. You will not be able to see much, but it will be there in the pores and grain where you need it. Now is the time to give the plane a good look and fill any holes or cracks that you missed before with Hobbypoxy Stuff straight from the can. It's not absolutely necessary, but I give the plane another coat of clear and wet sand before going on to the color coats.

A little time spent setting up for the color coats will more than pay for itself later. Temporarily attach control surfaces with cut-down toothpicks as shown for convenient handling. I seem to have better luck brushing colors if they are heated slightly. The handiest way to do this is with a two-lb. coffee can turned upside down with a lightbulb mounted in the side. Use a rubber-based test light force-fit into a hole cut in the side, open a few vent holes in the bottom of the can, attach a plug to the light leads and you're in business. A 40 watt bulb gives the proper amount of constant heat—no larger or things start smoking!

A really good brush is a joy to use, but rather expensive. I have found most of the standard camel hair brushes adequate. The 3/4" size seems to be the handiest—be sure to pick one with as soft a bristle as possible. When you do lose a bristle, be sure to pick it up immediately with a pin and touch up the spot so the paint can flow out.

Thin the base color about 10% and place it on your heater to warm up. While it is warming, vacuum clean your workbench, airplane, brush and anything else that is handy. Then lightly dust the plane with a tack rag.

When the paint is warm, brush on a thin first coat. I always work from the tail forward, working my way around the fuselage so my overlap areas don't have time to set up and leave a ridge. If you can figure out a way to hold the sticky plane, give it a second coat as soon as the first is set up (about 15 min.). The second coat should be flowed on as smoothly as possible and avoid excessive brushing. For most of the lighter colors, repeat the process the next night. The wing is most convenient to paint one side at a time, allowing about 15 min. between coats until the coverage is satisfactory. The next night flip it over and repeat on the bottom.

By now you should be thoroughly discouraged. You have worked hard and all you have is a "blah-looking" solid colored airplane, probably covered with those little bumps. Cheer up! The worst is over—it starts getting to be fun now. After 24 hours, 48 if you have the time, carefully wet sand the entire plane with No. 600 used very wet. Be extra careful not to sand through the paint on sharp corners. If you do, repaint them and

(continued on page 66)

"FULL-HOUSE PLUS THREE" new Heathkit systems



Great New Single or Dual Stick Designs

Eight independent channels in a package no bigger than conventional full-house transmitters. Exclusive Heath-designed IC encoder circuitry does the trick. There's an IC decoder in the matching receivers, too, that trims weight there. Choose either single or dual-stick control in 27, 53 and 72 MHz operation — with adjacent frequencies at no extra cost.

Styling to complement your most prized model. The thin-profile lightweight aluminum cases are covered in blue vinyl with no exposed fastenings to get in the way.

Great new features. Both transmitters have a two-position switch for landing gear, finger adjust tabs for auxiliary channels; trainer link jacks and "buddy button"; external charging jack for simultaneous charging of receiver transmitter and receiver batteries; eight range controls for adjusting servo travel. Our GDA-405-2 eight-channel receiver weighs just 2.5 oz, yet includes a new built-in connector block that eliminates space-wasting in-line connectors.

Flight weight as low as 11.3 ozs. You can order your Heathkit Eight-Channel System with any combination of four GDA-405-4 Miniature Servos or GDA-505-4 Sub-Miniature Servos. With receiver, battery pack and four Miniature Servos, airborne weight is 13.3 oz. Substituting four Sub-Miniatures, shown in illustration, brings the weight down to 11.3 oz. If you want eight-channel flexibility, the GD-405 systems, at build-it-yourself Heathkit prices, are the only way to fly.

Kit GDA-405-S, Single Stick Transmitter, only 4 lbs.	129.95*
Kit GDA-405-D, Dual Stick Transmitter, only 5 lbs.	109.95*
Kit GDA-405-2, 8-Channel Receiver only, 1 lb.	54.95*
Kit GDA-405-3, Receiver Battery Pack only, 1 lb.	9.95*
Kit GDA-405-4, one Miniature Servo only, 1 lb.	24.95*
Kit GDA-505-4, one Sub-Miniature Servo only, 1 lb.	24.95*

SAVE ON A SINGLE STICK SYSTEM: consisting of transmitter, receiver, battery pack and any four servos. Batteries included. List model numbers separately.

Special System Price **269.95***

SAVE ON A DUAL STICK SYSTEM: consisting of transmitter, receiver, battery pack and any four servos. Batteries included. List model numbers separately.

Special System Price **249.95***



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HEATHKIT
Schlumberger

WHERE THE ACTION IS

RADIO CONTROL

DON LOWE
SPORT AND PATTERN

Flying Safety: Lately we've been exposed to a fair amount of publicity regarding RC flying safety. Unfortunately activity in this area stems from disasters or near-disasters rather than a systematic planned effort to achieve the maximum safety possible. That seems to be the way of us mortals, however—we learn from doing and legislate by reaction. As long as we learn and then use our good common sense to properly react, then I guess our methods aren't half bad. I'm sure we recognize that our RC models by their very nature are not as safe as a game of tiddlywinks, but neither are they as hazardous as many other sports or activities.



Results of careless flying too near population area in Lincoln, Nebraska. See column for details.

We are showing you the results of a near-disaster in Lincoln, Neb., simply as a reminder that these ordinarily docile creatures can be fairly lethal if operated carelessly. Always fly under the assumption that control/pilot/airplane failures can and will occur. When they occur, the probability of danger to life and property should be minimized by flying away from populated areas. The craft shown in the picture hit a car being operated on the city street. Fortunately no serious personal injuries resulted, but as you can see it was close. All that we need is a fatality or two, well-publicized, to drastically restrict our freedom of operation. So please heed the two most important words in a modeler's vocabulary: "Be Careful!"

Polar Bears: There are a number of hardy types around who enjoy braving the cold for a little snow flying. There are several in our own club (Marvin Braley and sons) who do this all the time and really have a ball. I used to snow fly but the cold really gets to me now and I spend the winter building.



New Year's Day flying activity of the Winnipeg, Canada R/C Club. Ian MacDougall starts Max 60 at ten below in 20 mph wind. Brrr!

Ed Sweeney's unusual bicycle-ski equipped Nobler. An 80/20% weight distribution seems to work well.

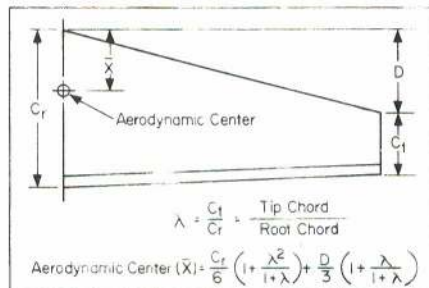


The Canadians make an event of it every New Year's Day regardless of weather conditions. This year it was 10 below with 20mph winds. Lots of frozen fingers and a half dozen ships flew out of twenty members in attendance. Just thinking about the chill factor prompts me to walk over and turn up the thermostat.

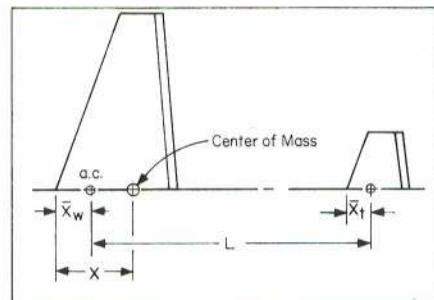
The Center of Mass or How to Locate the CG on Your Pride and Joy: Have you ever wondered at the mystery of proper CG location? Most guys will say: "Oh, balance it about 33% back from the wing leading edge at the average chord station on the wing." This usually works out fairly well and shifting the CG forward will make the ship more docile in pitch. Moving it back will make the model more sensitive in pitch, and if too far back will lead to nasty snap rolls and the like.

If you desire a more scientific approach to this subject, Air Force Major Ron Van Putte offers a technique. If you can't understand it, see your local aeronautical hot shot engineer! This technique guarantees (money back, Ron?) stability in pitch—up and down. Some adjustment in balance point may be desired after test flights to make the craft more or less responsive in pitch as discussed above.

The technique involves first locating the aerodynamic centers of the wing and horizontal tail. This data, plus the mathematical relationships shown, then yields the proper CG location. Locate the aerodynamic centers as follows:



Having found the aero center (\bar{X}) for both wing and tail, find the center of mass (CG) as follows:



CG (X) = distance to locate center of mass aft of wing root leading edge.

S = wing area (in sq. in.).

S_T = tail area (in sq. in.).

\bar{C} = mean aerodynamic chord (in.).

$$\bar{C} = \frac{2 C_r}{3} \left(1 + \frac{\lambda^2}{1 + \lambda} \right)$$

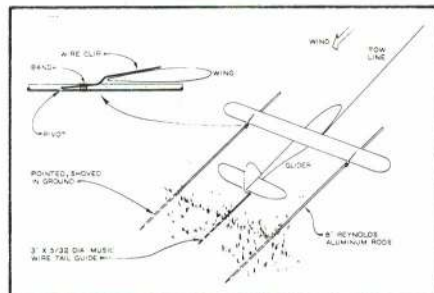
$$CG (X) = \bar{X}_w + \frac{L}{3} \frac{S_T}{S} - \frac{\bar{C}}{10}$$

With that, I think I'll close out this month and shift my own CG to the workshop.

CARL MARONEY
GLIDERS AND FAI

Wind Gust Restraining Device: AAM's Editor Ed Sweeney has designed a unique device to hold a glider permitting unassisted launching. From a contest standpoint the idea isn't too practical, however for locate flying it is sure worth an extra hand. The glider is held by the wings at about 30 degrees pointed into the wind. It is essential for the launcher to guide the model at least two feet to establish sufficient speed and directional control. Experiments with a Cirrus launched into a stiff wind resulted in a line pull that was so strong after launching the pilot needed only to stand still while the glider climbed to the top of the towline.

In this self-launcher, simplicity is obvious.



Tail guide is necessary. The wing wire clips are made so they won't interfere with the stabilizer if it brushes past. Optimum success can be achieved by setting the side rods close enough to also guide the stabilizer when there is little or no wind. The only critical trick with this is to keep the line tight enough to prevent the towline from falling off the hook!

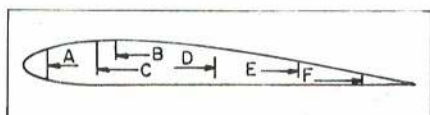
FAI Glider Situation: At the Paris CIAM meeting held December 2 and 3, 1971, there were no changes made to the existing FAI Provisional Rules for RC Soaring Gliders (Slope and Thermal categories). Agenda proposals requested a decrease in the max time to six minutes and a decrease in the towline length to 150 meters or approximately 500 feet. Having decided this proposal was premature, and that more experience and

opinions had to be gathered before any changes were made to the rules, action was delayed to allow the RC subcommittee to conduct a study.

Correspondence regarding soaring rules should be forwarded to Maynard Hill, FAI Delegate, c/o AMA Headquarters, 806 Fifteenth St., N.W., Washington, D.C. 20005.

Using Photography For Tapered Wings: From the February issue of the East Coast Soaring Society Journal, "Sailplane," there was the following method for making tapered wing ribs by Harley Michaelis, Walla Walla, Washington.

A perfect set of rib templates can be obtained by photographic means as follows: First plot the full airfoil 12" long, making a clear outline on white paper. Mark various reference points on this master outline as shown in the drawing. Key to reference mark is as follows: A, rear of leading edge; B, rear of leading edge sheeting; C, front of spar; D, center of rib; E, front of trailing edge sheeting; F, front of trailing edge. Carefully cut out and paste on a black background.



The master rib template should now be photographed using a 35mm camera with a 90-100mm lens to get a large image on the negative. In order to print reduced rib templates we need a guide to use in making proper enlarger adjustments. On a white sheet of paper draw a straight line for a reference. Using a ruler, preferably with a millimeter scale, mark on the left-hand side on the reference line a common leading edge. Now measure each rib cord desired starting from the common leading edge and mark the trailing edge on the reference line. While preparing this guide, use a fine black pen to ensure clarity and good visibility in a darkroom under red light conditions. Placing the guide on the easel, adjust the enlarger height for proper image size and make a series of exposures on double weight enlarging paper. When these prints are developed, the finished product is a set of airfoil outlines, with all reference marks (A through F) in the proper relative position with each other. Cut the prints out with scissors and use these rib templates as a guide when using an X-acto knife in cutting the full ribs. Then trim the actual rib for spars, sheeting, etc.

Any amateur with a small darkroom can make the complete set of prints in 30 to 45 minutes, depending on the number of different chords to be printed. Enlarging paper is cut in strips to save cost and then held flat by using a sheet of glass during exposure.

CLAUDE McCULLOUGH SCALE

International Scale Glider Rules: The FAI Scale Subcommittee is currently studying establishment of regulations for RC Glider competition. The new U.S. Scale Glider event that appears in the 1972 AMA rule book has been submitted for consideration and received favorable comment. Next in-person meeting will take place during the Scale World Championships at Toulouse, France the first week in August. Dr. Helmut Ziegler of West Germany is Chairman and member are Cizek (Czechoslovakia), Lestourneaud (France), Milani (Great Britain), Perrone (Italy), Trzcinski (Poland), Levenstam (Sweden) and McCullough (U.S.A.).

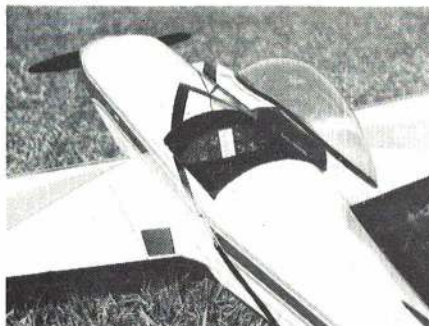
Whiz Bang: That, more or less, is the sound made by a Rom-Air retract gear as it cycles into the airplane frame with awesome force.

It's this power that makes the units great for the heavily-detailed landing gears of RC Scale—one of the few commercially available types that can do an adequate job—but the mousetrap action isn't very scale-like. Mike Stott is using this gear in the Meyers 145 he is building for the World Scale Championships. By adding needle valves in the operate and return lines between the Freon tank and the cylinders, Mike has been able to regulate the rate of movement over a wide speed range without loss of lifting strength. The valves restrict the flow of gas and can be adjusted to have one gear retract before the other to simulate the action often seen on full-size hydraulically-operated gears. Hank Pohlman suggested a refinement to Mike's version, using standard (non-RC) Supertigre needle valves and installing a sealing washer under the locking cap to stop the slight pressure leakage through the threads. After obtaining the desired setting, the lock cap is tightened down to seal the valve.



Bud Atkinson's stand-off scale model of the Boulton-Paul Defiant—note power turret.

Spinks Akromaster scratch-built by J. A. Garrett. Only purchased item was spinner. Home-made instruments. Span 60", engine K & B 40.



Quotable Quotes Department: From the Chicago Scalemasters Newsletter: "Properly trimmed, even a brick will fly; however, a light brick is a lot easier to trim than a heavy one."

Pass the Eyeball Test: Very few model finishes can stand a close-up examination. Here are some things to watch for to prevent flaws: Strain the thinned dope through a scrap piece of fine silk into the spray gun to remove little lumps of pigment. Don't wear lint-prone clothing such as sweaters and flannel shirts. Get rid of colored sawdust after sanding color dope just before final coats of clear by washing the surface with detergent and water. A speck of unnoticed dope sawdust will melt when the clear hits it and spread to all-too-noticeable size. Avoid touching the clean surface before painting. The first burst from the spray gun will often splatter—start the spray in mid-air and move onto the model. Move off the model before releasing the trigger. Try to keep the surface as horizontal as possible to reduce chance of running. Two light coats are better than one thick one. Use plenty of thinner. Pick your doping time and location carefully so some varmint of the insect world can't decide to

preserve himself for posterity embalmed in your finish.

Small Stuff: Sig is adding a line of miniature rivets that are just the ticket for super detailing. The aluminum 1/32 x 5/16" round heads will hold in balsa planking with a minute drop of epoxy in a hole punched in the surface with a needle or ice pick. Also available in copper 1/32" round and flat heads for functional riveting and installations that call for soldering. Further new goodies are a complete line of model railroad type 00-90, 0-8- and 1-72 brass machine screws, nuts and washers with taps and dies for the same threads. A particularly useful item for the scale builder is size 00 wood screws in several lengths.

BOB STOCKWELL PYLON

New Contest Guide: One of the real accomplishments of the past winter was the preparation of a wholly new "Contest Procedure Guide For RC Pylon Racing." The work was initiated when a Race Procedure Committee was established in the Southern California District of the National Miniature Pylon Racing Association. The So. Cal. NMPRA Vice President, Al Prather, wisely appointed Chuck Smith as Chairman of the Committee; and Bror Faber, the NMPRA National President, was one of its active members. Others who contributed actively included Bob Upton, Glen Spickler, Jim Jensen, Howard Fesler, Jack Fabbri and Howard Nupen. The work received a substantial impetus (otherwise known as a kick in the you-know-where) when the AMA Vice President for the California area, Alex Chisolm, sent word that AMA was doing a complete overhaul of the entire rulebook; and along with that word he sent the most incredible pile of outmoded, irrelevant, self-contradictory rules you've ever looked at—material that had piled up over the years and that needed total reconsideration.

We now have the neatest, cleanest, most explicit and helpful set of contest procedures you could ever hope to see. They will probably be printed in full in next year's rulebook; if you want a set of them in the meantime, you can get them for 50 cents from Bror Faber, 13422 Iowa, Westminster, Calif. 92683.



Prather-Owens Supertigre in Stockwell's job. Pic by Dick Tichenor appears in NMPRA Spectator Brochure.

The Contest Procedure Guide spells out safety procedures, both obligatory and optional. It provides a clear and usable set of criteria for handicap judging, and extensive detail on how to set up your heat rotation, for any number of entries. It spells out the conditions for disqualification, and it leaves no more room for argument about whether a contestant won the race by getting the checkered flag after cutting the third pylon on the tenth lap. It gives clear instructions for lap counters and explains in detail how to set up

a card system that will also make it obvious when there has been a cut.

If all CDs cooperate on following these procedures, we will have a nationally standardized racing procedure format that will eliminate the kinds of problems that have created dissension at several major contests in the past.

Promotion and Publicity: One of the most interesting of all the NMPRA committees is a specifically Southern California one whose work will be cashed in on by the whole country. This is the Promotion and Publicity Committee chaired by Terry Prather. It undertook two projects: (1) an information brochure to be distributed at local racing events; (2) a book on RC Pylon Racing. The details on the book are not all in yet, so I will tell you about it next month. The basic text is intended to convey the excitement of pylon racing. The text may be a little too poetic, but it has touches of humor and reality. See how you like it. . . .

What's happening?

Miniature aircraft are RACING. . . .

At speeds up to 150 miles per hour. . . .

With engines turning up to 20,000 rpm. . . .

Their pilots have lightning reflexes. . . .

. . . or dead airplanes. . . .

The pilots enjoy. . . .

The excitement of racing. . . .

The tension of competition. . . .

The satisfaction of fine hand craftsmanship. . . .

And sometimes they endure. . . .

The agony of crashes. . . .

. . . from mid-air collisions. . . .

. . . from dumb thumbs. . . .

And sometimes. . . .

They just get too close to the ground. . . .

. . . like six inches below the surface. . . .

. . . and no one knows why. . . .

Out there between the pylons are fliers. . . .

. . . the ones holding transmitters with antennas. . . .

. . . their hands shaking. . . .

. . . their throats tight. . . .

. . . their knees like rubber. . . .

Circling around the fliers are callers. . . .

. . . who tell the fliers when to turn. . . .

. . . and whether they're ahead or behind. . . .

. . . and console them when they lose. . . .

. . . and pick up the pieces when they crash. . . .

. . . and get none of the credit when they win. . . .

. . . but all the blame when they lose. . . .

At the pylons and starting line are race officials. . . .

who dedicate time and boundless energy. . . .

. . . counting laps and keeping the times. . . .

. . . watching for cuts, keeping the game fair. . . .

. . . hardly noticed till things go wrong. . . .

. . . always working, all indispensable. . . .

What controls the airplanes? . . .

The headbone's connected to the neckbone. . . .

The neckbone's connected to the armbone. . . .

The armbone's connected to the thumbbone. . . .

The thumbbone's connected

. . . loosely. . . .

To the transmitter sticks;

The sticks control the receiver

. . . up there in the airplane. . . .

It controls tiny motors,

. . . called servos. . . .

And they control the elevator

(. . . up or down. . . .)

The rudder and ailerons

(. . . right or left. . . .)

(. . . mostly left. . . .)

And when it all works. . . .

the little bird flies. . . .

just like the big ones!

These words of finite wisdom and vague description by Bob Stockwell.

Don't tell me: I should stick to writing prose. . . if that!

FREE FLIGHT

**BOB MEUSER
SPORT**

U.S. Free Flight Champs: Taft, California will again host this annual three-day affair over the Memorial Day weekend, May 27 to 29. Twenty-four events, trophies to fifth place in all but two events, a full set of Junior trophies for six events, plus Junior, Senior and Open Sweepstakes awards, and the Grand Championship trophy make it the biggest FF meet going second to the Nats, and worthy of its seemingly presumptuous name. (A rundown on the 1971 meet appeared in the November 1971 AAM, page 36.) Events include: Half-A through D Gas; Payload; FAI Power; six Antique and Old-Timer events; A/1, A/2 and Hand-Launch Glider; Coupe, Wakefield and Unlimited Rubber; both Gas and Rubber Scale; Rocket; Night Flying and Team Competition. Rent a house-trailer and camp on the field. For more info write Tom Hutchinson, 880A Magnolia, Pasadena, Calif. 91106.

Ric-Jet for Realism: How do you propel a sport model that is supposed to resemble a jet-propelled prototype? External props destroy the illusion; solid-propellant rockets and air-breathing pulse-jets have serious drawbacks. George Richter's Ric-Jet system is the answer.



That's a Ric-Jet F-104. It is not a normal ducted fan free flight. See column for the facts.

Ric-Jet from Dumas kit features Hawaiian Airlines colors. Tubular fuselage.



At first glance it looks like a ducted fan, but there is a big difference: the Ric-Jet uses a prop clipped to a diameter only slightly smaller than one that is standard for the engine used. Ducted fans have poor propulsive efficiency because of the high-velocity small-diameter jet. The jet diameter of a Ric-Jet compares with the slipstream from a normal prop, and may be even more efficient because of the shroud effect of the fuselage. In its simplest form, the Ric-Jet fuselage has a constant diameter from air inlet to jet exhaust—a "flying stovepipe" in effect. From the front

and rear, the fuselage appears simply as an open tube, but from any angle at which it is viewed while in flight it takes on a realistic solid look. Depending on the design, the engine may be inserted through the belly or through the tailpipe. The engine is inserted while it is running!

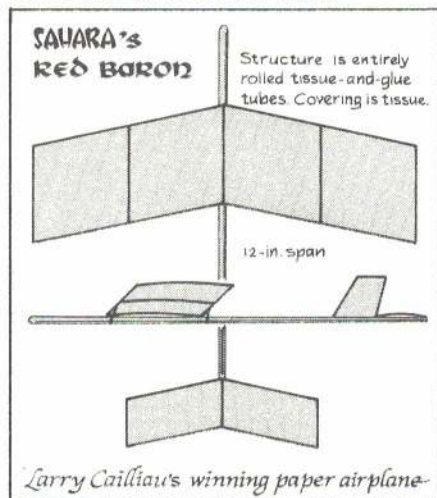
The DC-9 shown in the photo has a 22-in. span, a 30-in. length, and uses a Cox TD-010 with a prop clipped to a 2 1/4-in. diameter. Except for a little plywood at high-stress points, the entire model is constructed from 1/16-in. sheet balsa. The fuselage is made by forming a water-soaked balsa sheet around a cardboard tube or whatever is handy. After it dries, it is tissue-covered (inside and out) and heavily doped. To get a better idea of the scheme of things, get a Ric-Jet Catapult Glider by Dumas for \$1.95. George has built dozens of Ric-Jets, both scale-like and out-of-the-blue designs. His latest is a 35-oz. 049 Medallion-powered RC model with a 6-ft. span, and man-carrying Ric-Jets are on the drawing board.

Paper Gliders at the Sahara: When we saw the PR photos distributed by the Sahara Hotel in Las Vegas in connection with their 14-day World Airlines Employee Christmas Party, we knew the winner of their paper glider contest had to be an experienced free-flyer. And sure enough, we found that Larry Cailliau, 28, a TWA pilot, was Junior Champ at the Sixth King Orange Internats, won a first in Indoor HL Glider at a Nats, and held a Paper Stick record in his younger days. After his modeling career was interrupted by college, starting a family, and his early airline career, he returned to free flight in 1967 to take home a third-place Indoor HLG Nats trophy with a two-flight total of 2:22.2—a hair behind Lee Hines and Larry Miller.

The only rule for the Las Vegas paper plane meet was that the aircraft had to be constructed entirely of paper, cardboard and glue. After trying and discarding all of the conventional designs, Larry tried models resembling I.H.L.G.'s, but constructed of postcards. They were too heavy for the 15-ft. ceiling available, but would do about 15 sec.



The Sahara Hotel offered daily winners in the model plane contest \$25 worth of chips (of course they mean poker) in Vegas!



Larry Cailliau's winning paper airplane.

in a 30-ft. ceiling. The winning model was constructed entirely of tissue and glue. Spars were made by wrapping a glue-coated strip of tissue around a 1/16-in. dia. wire—the tissue tube is slipped off the wire while still soggy and allowed to dry. The fuselage is similarly made, but larger. The nose weight is a rolled-up tissue plug. The model is thrown with a left bank and circles to the left in the glide. His winning time of 9.4 sec. is not bad for a 15-ft. ceiling—and a 14-day party!

BOB HATSCHEK GADGETS AND EQUIPMENT

Finders Keepers, Losers Weepers: Model airplane contests are not always won—or lost—in the air. All too often, winning depends on reliable retrieving of that hot ship after each max. And any experienced free-flight competitor wishes he had a nickel for every hour he's spent searching in cornfields, wheat, woods and high weeds.

Like competition flying itself, consistently finding models that have gone over the fence is not strictly a matter of luck. In April we discussed such retrieval aids as compasses and binoculars. These help tremendously in getting to the general area of a downed model. But there's still the problem of trees, tall corn and thick weeds.

One answer to this phase of the retrieval problem was seen at an eastern FAI semi-final meet a number of years ago. One of the Cleveland fliers had cleverly installed a stripped-down bicycle horn in the fuselage of his model, along with a pair of pencils to power it. A simple switch made of music wire was held open by a rubber band, and the dethermalizer fuse burning through this turned on the juice when the tail popped. Total weight of this useful installation was probably no more than two oz.

Time, however, brings progress. Now there's a little noisemaker that's light enough to put in a 1/2A power job. This is a miniature solid-state electronic buzzer that measures approximately 3/8 x 5/8 x 7/8" and weighs a mere 1/4 oz. Put three volts across it and it gives out with an 80-decibel buzz at about 400 Hz (measured at a one-ft distance). Output volume and frequency are both reduced with voltage, but even at 1.5V the signal would prove mighty useful in a wheat field.

Designed for use in battery-powered alarm clocks, intercoms, pocket paging units and similar devices, the power consumption is less than that of a signal lamp. It draws about 15 milliamps at 1.5V, or about 30ma at 3V. This means that even a dethermalizer-actuated switch is unnecessary. Even a single AAA battery (1.5V) should last long enough for a significant number of flights if the buzzer is turned on just before launching, then turned off when the model is picked up after a more normal retrieval. This can be easily done by twisting a pair of wires together to close the circuit, or simply by removing the battery.

Probably the best place to mount it is in the wing near the root, with the buzzer snug up against the main spar. This way, the buzzer transmits its vibration directly to the wing structure and the covering acts somewhat like a speaker cone to mechanically amplify the sound. For convenience, the battery should also be in the wing, in an open box on the bottom surface for example, with the battery held in place over the wing saddle. Total weight of such an installation with one AAA battery would not be much more than 1/2 oz.

Manufacturer of this device, the Model GA 100 miniature electronic buzzer, is Projects Unlimited, 1926 E. Siebenthaler Ave., Dayton, Ohio 45414. Vice President Wayne Dixon brought it to our attention, and he quotes a price of \$5.95 each in quantities of 1 to 24. They are available from local electronic distributors and hobby shops.

Or Find It Electronically: If you can afford a bit more money and space, and several more dollars, you can solve the model-locating problem even more effectively by installing a

radio transmitter in the model. That's right—a transmitter, not a receiver.

Estes Industries (Box 227, Penrose, Colo. 81240) offers the "transroc" for data telemetering and for locating model rockets. There's no reason why it won't go into a model airplane as well, since its weight is merely 1.4 oz. and it only takes up some 4 1/4 in. in a one-in. dia. rocket tube. A 30- to 45-in. antenna wire poses no problems.

No FCC license is required since power input to the final RF stage is less than 100 milliwatts, the antenna is less than five ft. long, and operation is in the 27 MHz Citizen's Band. What is required, however, is a walkie-talkie (must be the more expensive super-heterodyne type) with a matching crystal for ground equipment. This can be used with either its standard whip antenna or a directional loop antenna. An outstanding instruction manual comes with the unit telling how to make a loop antenna for the receiving end.

Range of the Transroc is up to five miles in flight or up to 500 yards with the model lying on the ground. Price of the Transroc, ready to install but without the required 15V battery, is \$21.95. Or, if you've got more hours than dollars to spare, a kit is available for \$14.95. Packing tiny components on a very small circuit board, the kit isn't the easiest thing to put together, but it should be well within the capability of any free flyer who's a good enough builder to need it.

More on Propeller Safety: Russ Hansen, of Detroit, adds another thought on why some plastic props are failing at very high speeds (over 20,000 rpm, as noted in February 1972 AAM). His point is that considerable heat is transmitted directly from the engine's crankshaft to the prop hub. "Just try to touch the shaft after a run," he notes. This heat softens the plastic and the tremendous centrifugal force of the fast-revving prop does the dirty deed.

Russ, however, is not a guy to sit back and deplore such a situation. He's put his considerable manufacturing savvy and 18 months of effort into developing an FAI prop that stays together. Made of a poly-epoxy resin (that costs \$9.25 a pound as compared to 68 cents a pound for nylon molding resin) and reinforced with 16% glass fiber, the Hansen props are modeled after the Cox 7 x 3 1/2 and have been flight tested at up to 25,000 rpm.

These props are a bit lighter (9.8 grams vs. 10.7 grams) than the German Bartels fiber-glass-epoxy replicas of the same Cox prop, and a bit more flexible. In good condition, both Hansen and Bartels props seem safe at very high speeds—and they pull! Price of the Hansen props is \$1.50 and they are only available from NFFS Services and Supplies, P.O. Box 322, Dallas, Ore. 97338. All profits go into the National Free Flight Society treasury.

BOB STALICK GLIDER, RUBBER AND POWER

You, Too, Can Be a Future Old-Timer: Way back when men were men and Jack Armstrong was King of radio (and not RC), the smell of 3 and 1 fuel and the roaring 5000 rpm clatter of an ignition 60 filled the air at



A competitive 1/2A old-timer is this Goldberg Interceptor flown in 1/2A Gas at the 71 Nats.



Scene at Nats Old-Timers event last year.

Eugene Bartel with competition 1/2A model that sports underslung pylon pusher engine and birdlike surfaces.



fields all around the U.S. A miniature airplane circled into the blue, engine running not 10, 20 or 30 seconds, but on and on. And this was not really a miniature model airplane, but a behemoth with a wingspan of 6, 8 or 10 feet.

You may have to look around a bit, but here and there, in attics and closets, are some of those same engines, some parts of those same airplanes. Sure, they're dusty and stiff. You would be too after 30 years. Every so often you can still hear that sound, as well as experience the sights and odors—it's an old-timer contest. This meet draws a different kind of contestant and a different kind of spectator—one whose hair, if still there, has turned a bit greyer; whose muscles have lowered his center of gravity. But, he'll tell you about the times when...

You can be a future old-timer and build that 6-, 8- or 10-ft. monster. Of course there were smaller ones, too! Smaller than today's 1/2A models. All sizes, all designs. And then there are the glow .020-powered miniature models. How about a full-sized Buzzard Bombshell, and a 1/2-sized one, too, both decorated the same like big and little brothers?

Want to know how to get started? Write to guys like John Pond who's got over two gross of plans from the pre-war period. \$1.25 buys you any one of them postpaid from 4135 Avati Dr., San Diego, Calif. 92117. Twenty-five cents will get you his complete plans list. Stanton Hobby Shop has O.T. kits and ignition engines. Drop them a letter for their list. Free Flight Specialties, 6255 S.W. 47th Pl., Portland, Ore. 97221 has .020-sized plans photo-reduced from the originals at \$1.25 each. Also check the classifieds of this magazine—if nothing else, it's interesting reading.

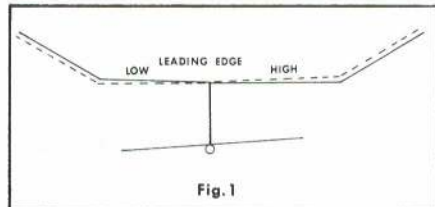
How're Things in The Rut Dept.?: Ever since those old-timer days, when active Free Flyers like Bill Winter, Walt Schroeder and Carl Goldberg were ripping up the sky with their Vagabonds, Jersey Javelins and Comet Clippers, the hue and cry was "they don't look like airplanes," or "they all look alike!" Free-flight models have come, some say degenerated, a long way since then. The old-time Pencil Bomber is this generation's Starduster. A few, however, are brave enough to venture out and try something new. Maybe you are one of these stalwart souls.

One such modeler is fellow WMC member Gene Bartel, whose out-of-the-rut semi-scale F-4 and Auto-gyro slope soaring gliders have won him design awards at the RAMS Sym-

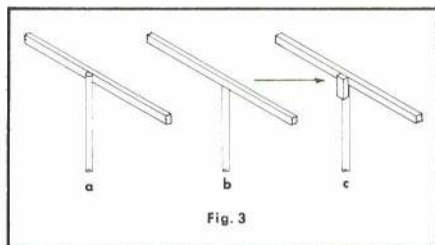
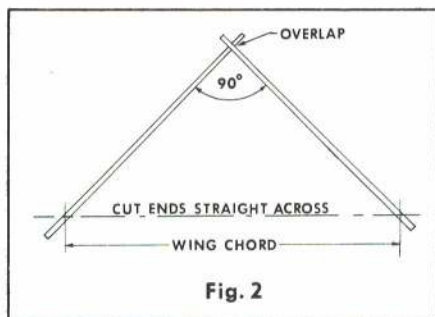
posium. For several years he has been working on and competing with his underslung pylon pusher 1/2A free flight. True, it doesn't look like a real airplane, but when is the last time you tried something out-and-out unusual? Perhaps it's time to begin.

BUD TENNY INDOOR

Wing Bracing for Beginner Models: Indoor model beginners can avoid test-flying disappointments by assembling the model and viewing it from the front. Wing and tail alignment should be as shown in Fig. 1. The wings



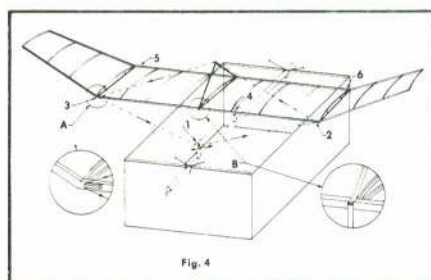
should be slightly twisted as indicated by the dotted lines—inboard leading edge high and outboard leading edge low. The stab should be tilted toward the left. If the wing structure is too weak to hold these adjustments, or if "wrong" warps can't be worked out, simple bracing can help.



Need Bracing? Wing bracing needs an elevated "leverage point" to work properly, so a vertical structure called a cabane (Fig. 2) must be added to the wing. Fig. 3 shows two possible wing post arrangements—3a is best, with the post in front of the spar, while 3b shows the post joined under the spar. In the case of 3b, make a small platform for the end of the cabane by attaching a small block ahead of the spar as in Fig. 3c.

Mount Cabane: Detail B of Fig. 4 shows the cabane attachment. With the model assembled, glue the cabane on top of the post/spar joint, perpendicular to the spar. Support the model in level flight position (notches in a cardboard box will suffice) as shown in Fig. 4. Add small blocks of 1/32-in. sq. balsa at each numbered location on the wing as shown in Detail A.

Add Bracing: Glue one end of the bracing material on the left side of the wing post beside the lower end of the block at 1. Run the bracing around the block at 2, through the "V" of the cabane, around block 3 and back



to the right side of the post under block 1. Pull out the slack and glue the bracing at 1 and on top of the cabane. Repeat this sequence on the other side of the wing, using blocks 4, 5, 6 and the cabane. View the model from the front and slide the dihedral joints up and down in the bracing until the alignment looks correct according to Fig. 1, then glue the bracing at 2, 3, 5 and 6.

Bracing Materials: Competition indoor models are braced with very fine nichrome or tungsten wire, available from indoor suppliers. Some modelers prefer to use monofilament dacron (free sample available from Bud Tenny, Box 545, Richardson, Tex. 75080). Beginner bracing can be done with dacron sewing thread, obtainable at many fabric centers. Ask for dacron or polyester thread, in the smallest size available. This stuff may seem like rope, but it is highly visible and affords excellent practice in bracing. Later models can be braced with smaller materials—the important thing at this point is to make those first models fly!

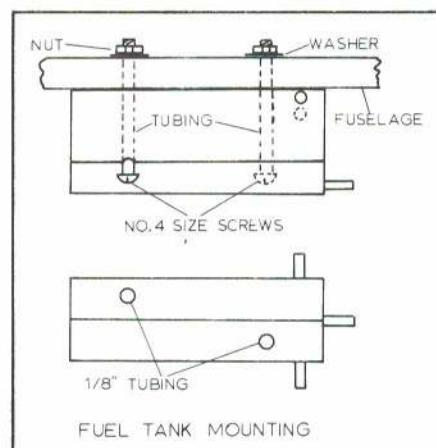
CONTROL LINE

BILL BOSS SPORT AND SCALE

Line Clip Connectors and Crimped Tubing Terminations: For reasons of safety and standardization a statement on line clips and crimped tubing terminations has been issued by the AMA Control Line Contest Board, and is to be included in the 1972 rule book. The following is a brief resume of the statement. **Line clip connectors**—Each load bearing line connector shall have a test rating equal to at least the total pull-test required on the model (i.e., if the model requires a 40 lb. pull-test, the connectors will have to be test-rated at a minimum of 40 lbs.). The burden of proof of the test rating will be the responsibility of the contestant. However, test ratings on factory-packed connectors will be accepted.

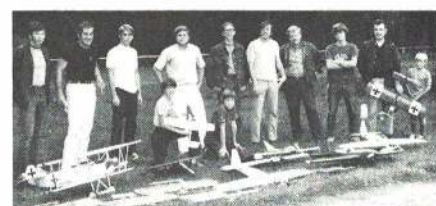
Crimped terminations—The crimped tubing method of making line terminations applies only to stranded lines. *Solid lines are not to be terminated with this method.* Line terminations using the crimped tubing type of construction as supplied on commercially available ready-to-use control lines are acceptable for use in all events in which multi-stranded lines are permitted. Crimped line terminations constructed by the modeler may also be used on multi-stranded lines, provided they are made using soft tubing material, and the builder follows the instructions such as those provided in commercial line termination kits. It is mandatory that three-line thicknesses pass through the tubing before crimping. Be sure you don't injure the wire during the crimping procedure. These guidelines for control lines are also recommended for construction of the model's leadout wires. Be safe—inspect your lines often.

Fuel Tank Mounting: Tired of mounting your fuel tank on that profile with rubber bands and soldered-on tabs? Well, the accompanying



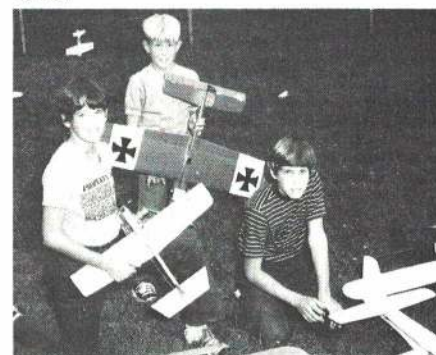
sketch outlines a method used by Dave Downey, of Manaus, Brazil that certainly is different. He uses two No 4 size machine screws that pass through the tank and fuselage. To mount, drill or punch holes in the tank as shown in the sketch. Next insert 1/8" ID brass tubing through tank and solder in place. Cut off tubing on "V" side of tank leaving enough tubing for screw head to clear tank body. Leave a small length of tubing on opposite side for insertion in fuselage. Make appropriate holes in the fuselage and mount tank with long screws and nuts. This method keeps the tank firmly in place so it will not jump around or come loose from vibration.

Fuel-proof Your Wooden Props: You can put a hard fuelproof finish on wooden props by following this simple procedure. Take any wooden prop and carefully balance it. Next, mix some epoxy and coat prop. While the epoxy is still fluid, mount the prop on a shaft; insert assembly in an electric drill and spin for a minute or two. The prop should be spun inside a large cardboard box to catch the excess epoxy. After spinning is completed, hang the prop up to cure. The end result will be a hard fuelproof coating which makes the prop more resistant to breakage.



New NR Aeromodelers at their field. Primarily a CL group but note there are two RC kits in this lineup being flown CL.

NR Aeros are big on Juniors. Control line is still the best way to learn about modeling and flying.



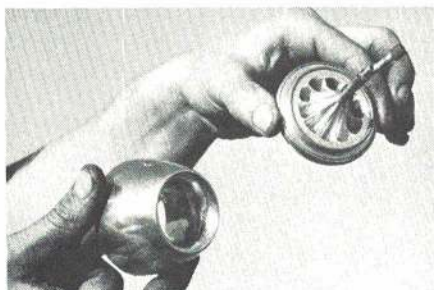
New Club: The Central Ohio area has a newly-formed club known as the NR Aeromodelers sponsored by North American Rockwell. While the Club participates in many phases of model plane activity, its main interest is control line. Their outdoor activities are held at the North American Rockwell Recreation Park which boasts fencing and spectator bleachers, while indoor activities are held in the NR Activities Building Auditorium.

Membership in the Club numbers about thirty. One of the members, Ken Johnson, is a record holder in AMA's Ornithopter class. We'd like to wish this new club every success in its present and future endeavors. The Club would like to receive newsletters or correspondence from Midwestern area clubs. Write Samuel C. Wright, President, 4144 Wright Park, Columbus, Ohio 43213.

JOHN SMITH SPEED AND RACING

A.R.T.A. Models: We've all heard of ARF (almost-ready-to-fly) models the RC gang has made so popular. Well, now we have Almost-Ready-To-Assemble CL Speed models. The models presently available are for each end of the speed scale—1/2A Profile and Jet Speed. Both of these kits are unbelievably complete, needing only glue, paint and the power plant to make them ready for competition.

The first, a profile proto kit by Dale Kirn (Kirn Kraft, P.O. Box 224, Anaheim, Calif. 92805) comes in a small box. The fuselage, including hard wood engine mounts, all holes drilled, slotted for wing and tail, and engine mounting nuts installed, is ready for final sanding. The wing and tail have sanding guidelines on them, the stab is partially cut loose, horn hole drilled, and the bellcrank mount is installed in the wing. The landing gear is completely finished, wheels installed, all soldering is done. The rest of the kit reads like a hobby-shop shelf. All nuts, bolts, washers, the bellcrank finished pushrod, metal parts—even a gas tank and fuel line. If a Junior can build a hand-launched glider, he can build a "Torky" Proto ship.



Three-piece jet head by Norm Drazy helped him reach 169.74 and win the Southwestern Regionals.

Here's a noisy bunch for obvious reasons. Dale Kirn, Jim Rhoades and Norm Drazy (l to r). Note name of Norm's plane, Light My Fire—whoosh.



The jet ships from M.G. Hoyt, Rt. 2, Newton, Iowa, 50208 are just as complete. The one I built is the "Sidewinder." Again, a full box of goodies, including a carved fuselage with 11 oz. tank installed, fully carved wing and stab, metal hinged elevator, aluminum fin, controls unit, either a two wire system,

or, for a buck more, you get a torque unit. All hardware, engine mounting brackets. Both these kits can be built in a couple of evenings—the biggest part is waiting for the glue to dry! So if you want to become involved in our ever-growing sport of going fast, drop a note to these fellows. You won't be disappointed.

Rule Book Rewrite: The control line rules are being rewritten to clarify them so that they may be more easily understood. No rules are being changed, only put in easier to understand terms. Many interpretations were used of some rules and many fliers found themselves being regulated during competition differently in different parts of the country. This problem has been brought out at the Nats each year when processing. Many models were not up to specifications, but had been allowed to fly in other meets before the Nats. Many people complained that rules could be taken a couple of ways and even Contest Directors and Event Directors couldn't agree on some of them. It is hoped, by the group who is working on this project, that when the rewritten rules appear, it will take judgment decisions away from CDs and give everybody a set of rules that will be more easily understood.

Quotes of the Month: From the "Prop Blast," Cosairs M.A.C., Tempe, Arizona. Announcement for club work night. "... Just bring your work clothes and problems. Let's face it, if we didn't have problems we all would be National Champions."

This was overheard at the Dayton Speed meet last fall after a C ship wouldn't release from the dolly. The model ran out the tank taxiing at well over 100 mph. "After you change the prop, Herbie, you better repack the wheel bearings on the dolly."

CLCB Doings: The Control Line Contest Board has ruled out crimped tubing type clamps on all but stranded (braided) lines. This affects all speed fliers who use this type of end loop. So if you have used a crimped tube to secure your line ends after making the loop, make up some new lines using the suggested methods shown in the CL section of the AMA rule book. It is sure easier in the workshop than on the field.

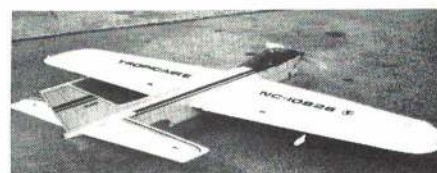
JOHN BLUM CARRIER AND STUNT

Landing Gear Problems: Scale models have historically presented landing gear problems for modelers, which become compounded for the Navy Carrier enthusiast. The near vertical gear alignment coupled with the closeness to the center of gravity of most scale choices presents unfavorable limitations. These situations cause the model to nose-over easily and offer a critical strength problem. The rules specify that the gears must project from the model in the same location as the prototype, but do not require the wheel location to be scale. Consequently, the gear can be bent forward to place the wheel well in front of the center of gravity creating better ground handling characteristics. This is beneficial on a forced landing. Considering the impact of a model during an arrested landing, the vertically aligned gear transfers most of the impact to the wing and gear mount. In some cases, the landing gear has been driven through the wing. By moving the wheel location forward several inches, the landing gear then produces a spring-effect, absorbing shock, and produces another benefit.

The thick-rib, slotted type of landing gear mount such as that found in the Robert's Mauler and Corsair kits is the most effective and efficient. It also affords easier replacement.

The tail-wheel does not usually present any problems. However, note the location of the tail-wheel in the TBF Avenger photo. Any ideas?

Stunt Event Promotion: All-stunt competition, including the Old-Timers event, is again in swing for the 1972 season. One is planned for the St. Louis area and another at Champaign, Illinois in September. Watch the AMA listing.



Les McDonald's King Orange winner—he fuels it with OJ. Jet-like stunters need retracts, is anyone trying them? Let AAM's writer know.

TBF Avenger by Jim West won at SW Regionals with S.T. 40 RC engine.



Jim LaBarge's Dumas Crusader does only 10 sec. slow lap time on 35 engine. Light model has plenty of lift.

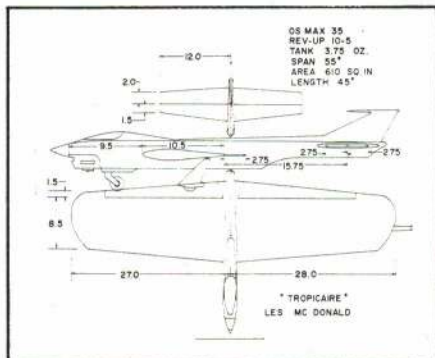
New UC Club: Modelers looking for a club in the Aston Twp., Pennsylvania area should contact Rudolph M. Liebeskind, 650 Convent Rd., Aston Twp., Penn. 19014. Club has 30 members and is engaged in all types of control-line flying.

Proof of Carrier Landing: Modelers are still finding some problem areas as the range of designs increases. A letter from the Department of the Navy (via Harry Higley) informs us that the XTBF3 Guardian made simulated carrier landings at the Naval Air Test Center in 1949. This is the Guardian without sub-rudders.

Most Difficult Maneuver: Many stunt fliers feel that perhaps the most difficult maneuver for the novice to master is the landing. Like any other, it'll take considerable practice and knowing one's airplane. The model with conventional landing gear affords many aspects that are best understood by modelers with respect to location, mounting, etc. However, many perfect scores have been spoiled when the model rolled into the wind during the landing and again lifted off of the strip. The big influence affecting most models in this situation is the model's angle-of-attack in the sitting position. In other words, what is the angle of the model's longitudinal center line in relation to the horizontal surface on which it sits. If this angle is high, the wind, coupled with forward motion of the model, can create a lifting force that is hard to handle. If the angle is low, the probability of the model again lifting off after landing is lessened.

Using model magazines for reference, compare these aspects. Note that although many Nats entries have conventional gear, the angle of the model to the ground has been kept low in most cases.

This can also be controlled by the use of tri-cycle landing gear. When the model touches down on landing, down elevator can be applied to keep the nose down and removes the influence of the wind. Exceptions of this can be found of course, but they are usually related to the highly experienced flier. The last possibility is, of course, to fly when there is no wind.



HOWARD RUSH
COMBAT

Slow Combat Rules: For their Slow Combat and Slow Rat Racing events, the Fort Worth, Texas Cowtown Circle Burners add the following airplane requirements to AMA rules: 24" minimum fuselage length (prop nut to elevator hinge line), 37" minimum wing span, 300 sq. in. minimum wing area, wheel-type landing gear capable of ROG, and suction fuel system. The Circle Burners have used these rules successfully for three years and the rules are now pretty much standard for AMA District VIII. To slow things down even more, some clubs add the restriction of 10-6 props or provide low-nitro fuel.



Part of the Slow Combat line at the 1971 Texas State Champs in Fort Worth. A beginners' event, but can it stay that way?

The Queen City U-Control Club of Cincinnati, Ohio uses essentially the same airplane requirements as the Circle Burners and also requires the use of a plain-bearing engine. In Cincinnati contests, a kill is counted only

as a cut and does not end the match. There is a speed limit of 70 mph. A speeder is penalized ten points for every mph in excess of 70 and is disqualified if his plane exceeds 80 mph.

Why Slow Combat: There is disagreement over the purpose of Slow Combat as a competition event. Many who fly it see Slow Combat as an event in which profile sport models can be flown, intended for the beginner or not-too-serious contestant. But there is another group, perhaps as numerous, which flies Slow Combat as a second, fully-competitive event along with AMA Combat. Should Slow Combat be restricted to the novice? Maybe a handicap system could be devised. What ideas do you have?

Cure for Blushing: The rainy season is upon us when dope acquires a dull, milky look after applied and doesn't adhere well. The cure is to add retarder to the dope—it slows the drying but makes dope brush on more easily and eliminates blushing. Lacquer retarder can be found in an automotive paint store. Sherwin-Williams No. 206 Concentrate retarder has worked well for me. It is compatible with Aero Gloss dope as well as butyrate dopes.

New Weapons: Two new Combat kits are scheduled for release this month. Phil Granderson's *Tyrantula II* is being kitted by Anderson Enterprises of Portland, Oregon. No address for Anderson, but Phil can be found at 2105 N. San Antonio, Pomona, Calif. 91767. The author's *Nemesis II* is being produced by M & P, 1222 Briarcoe, Richardson, Tex. 75080. Both are sidewinder-engine, stabilator rigs with sheeted leading edge and provisions for bladder-type fuel systems.

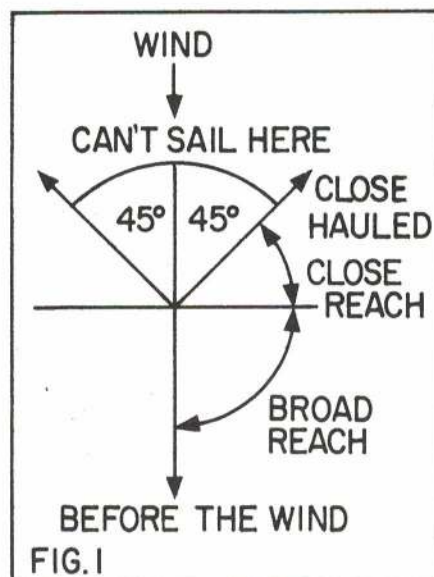
Castor Oil vs. Synthetics: Engine man Duke Fox ran some comparative tests among lubricants and found that engines run on synthetic oils wore out completely after 25 hours, while engines burning castor oil fuel were still going strong with eight times as much operating time. For this reason, Fox fuels are still made with castor oil.

special
interest

CLIFF PETERS
RC BOATING

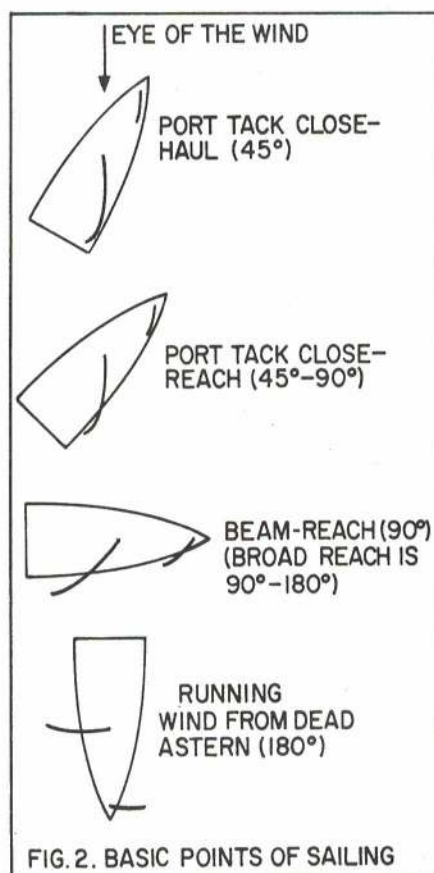
Mini-Course on Sailing Fundamentals: Unlike any other form of model RC boating, sailing requires just a little more basic knowledge. Submitted by Jay Brandon, the following will give the beginner a start in his sailboating and also a bit of knowledge concerning the why's.

A sailboat cannot be sailed directly into the wind. The closest is approximately 45 degrees to the direction of the wind. When sailing close hauled (at 45 degrees to the wind) most of the driving force is provided by the lower pressure on the back of the sail. The shape of the sail is an airfoil, just as an airplane wing, so it's most important to keep the wind flowing smoothly over the sail. If the jib is trimmed properly (positioned at the proper angle to the wind) it will increase the velocity of the air over the back of the sail and thereby increase the pull of the sail. If the boat is sailed too high into the wind (turned within that 45-degree portion), the sail will "luff" or flutter along the mast because the wind is striking both sides of the sail. To stop this



luffing, turn the boat downwind until the sail stops fluttering or luffing.

To "come about" (sail with the wind coming over the other side of the boat) have the boat close hauled and moving well. Turn it sharply into the wind and hold the rudder until the sail starts to fill on the other side, then return the rudder to center. To continue to sail in the direction from which the wind is coming, first sail close hauled on one side, then come about, and sail close hauled on the other side. This is called "tacking" (zigzagging into the wind). If the boat is balanced prop-



erly with the center of wind pressure on the sail slightly to the stern of the center of pressure of the water on the keel, the boat will have a slight tendency to head up into the wind.

This can be counteracted by setting the rudder to head the boat slightly downwind, and thus keep the boat on a straight course. If the rudder has to be set at a sharp angle to accomplish this, then the mast was set too far astern in your model and it should be moved slightly forward.

To sail in other directions, such as on a close reach, a broad reach, or before the wind, always remember that the sails must be set so they obtain the largest force to drive the boat ahead. If the sails are trimmed in too tight, too much of the driving force is used to tip the boat or to drive it sideways.

If the sails are out too far, they will not present the best angle for obtaining the maximum forward thrust or push. This is where practice will pay off for quickly obtaining the optimum sail position and thereby cause the boat to move in the desired direction at its best speed.

Keep in mind a very important "rule of the road" when sailing with another boat: The craft on a starboard tack (with the wind coming over the starboard—right side) has the right-of-way.

A New Racing Class?: Because of the growing popularity of the schooners Emma C. Berry and the America, a new class is under consideration by the American Model Yachting Association. It would be called the American Fisherman Challenge. Any official boat would be a 3/8" scale model of any schooner designed or built prior to 1930. The successful "Bluenose" is expected to become a member of the class. If the model follows the success of its prototype, it will indeed rarely lose a race.

Model Boating On The Decline?: We have been receiving more and more boat club newsletters and anyone who believes that model boating is on the decline or is of negligible popularity should have to take a week off to read them.

BOB BECKMAN RC CARS

Getting Started: Received a letter a while back that said: "I am doing work on a 1/8 scale sports car of my own design. In order to complete it I need some parts. Most important, I need four universal joints of the cross and yoke type. The car is to be independently sprung, front and rear. Any catalogues or information you could send would be appreciated." In answering the letter, several things came to mind.

While I've been running cars for some time now, I really don't have much on hand in the way of catalogues or other information. So this is a plea to those of you with parts and supplies for cars. Send in copies of your catalogues or just a list of what you have and your address. I'll try to make up a list of suppliers to send to the people looking for parts.

The next point is what I call the "big bite, small chewing capacity" syndrome. Twenty to thirty years ago when radio control of model planes was really practical on a widespread basis, we all knew at least one newcomer who was going to start out with an exact scale B-17 with four engines, retractable gear, dropable bombs, turrets that rotated, guns that fired, etc. (Some of us were that sort of newcomer.) Many of those things are being done now, but in the early days they weren't possible, and even today they aren't practical for the beginner. The same thing applies to our RC cars, and we're still in the "early days." We have practical and reliable radios thanks to years of development, but there is still a lot to be learned about suspension, tires, transmissions, brakes, etc.

I am not saying that we shouldn't be trying to improve our cars and make them more realistic. The point is that as in any endeavor there are a lot of basics to be learned before moving on to more sophisticated levels. And in some areas, those basics haven't even been discovered yet.

So, the best advice for the newcomer is: "Keep it simple." There is an ulterior motive behind that advice—if you start out simple and have enough success to keep you going, you'll be around for me to race with. If you try too much too soon, you might get discouraged and quit before we get a change to chase each other around a parking lot. And don't get the idea that "simple" means dull and uninteresting. Simplicity and ruggedness usually go together, so you spend more time on track where the action is. There is nothing duller than a complicated, fragile car that spends 99% of the time in the pits.

"That's fine," you say, "but I'm just starting and I don't know how to tell what's rugged and practical from what sounds great but doesn't really work too well." The best answer to that one is to get together with other people in your area and ask questions and see what they're using. You've got to get together anyway, if you're going to do any racing. "But I don't know of anyone else around here," you say. A remedy for that is to check with the local hobby shops. Look under "hobby" and "model building" in the yellow pages. Go to both slot car and model airplane shops. This will kill two birds, since you'll find where to get what you need and also get in touch with other car builders.

If you don't see RC car material in a shop, ask about it. Most model shop proprietors are more than willing to help; even if they don't carry cars they can usually tell you who does. And the more people ask for something, the sooner they will start to stock it.

The next step in finding other people is ROARING. No, not out loud, but by joining the Radio Operated Automobile Racing Society (ROAR). ROAR has started a listing of local clubs and will be able to provide names and addresses of organizations in your area. You'll want to join ROAR anyway, because you get a copy of the competition rules used throughout the country and monthly newsletter, and can run in ROAR sanctioned races. For information write to ROAR, 3703 Dover Dr., Fort Wayne, Ind. 46805.

And finally, valuable sources of information to help in the building and running of your cars are the various modeling publications like **American Aircraft Modeler**. And don't just look for articles about cars. The radios and engines we use came direct from model airplane developments; many of our construction and operating conditions are closer to RC planes than to slot cars. Construction articles, "how to" columns, and advertisements all contain valuable information, even though most of them are airplane oriented.

There's a lot more to getting started, but it can't all be covered at once. Send in your questions to me c/o AAM and we'll try to get them answered. Also, let us know what you are doing so we can pass it on to others. Pictures of cars and race activities are particularly welcome.

JOHN BURKAM HELICOPTERS

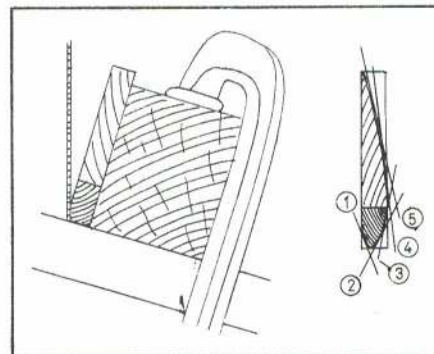
Make U.S. First in RC Helicopters: In *Le Model Reduit D'Avion* (Dec., 1971), Georges Chaulet writes that in RC chopper development the Americans are just behind the Germans. Dieter Schluter and Bruno Gottfried certainly proved that at Doylestown last September.

We should be first in helicopters! There are at least fifty times as many of them in this country along with the engineers who developed them. We have readily available RC equipment and materials. Stock Drive Products (55 S. Denton Ave., New Hyde Park,

N.Y. 11040), the first really good source of all the gears, pulleys, belts, bearings, and other goodies needed for RC helos, is now offering a \$39.95 kit of stock parts for 2 B's main and tail rotor drive system and will soon offer actual specifically machined helicopter parts, rotor hub, clutch, tail rotor, etc. We have millions of the most inventive people in the world. All we need is the incentive: recognition, publicity, association with others in the same field of interest. If the unofficial RC Helicopter event comes off at the Nats it will provide all three of these incentives. Then we must continue to communicate with each other, pass on good ideas, publish successful plans and related articles, be seen at contests, and go after world records (the Germans have three to our one, but they're not too difficult to beat yet). Build kit helicopters, learn to fly them, and improve on them. Study all available information on model hoppers and real ones. (I have a short bibliography of info on model helos for an eight cent stamp, and will also include, if requested, a list of names and addresses of all those who have written to me about model helicopters.) Above all, scratch build your own designs. There's just about nothing on earth that gives more lasting satisfaction and sense of achievement than successfully flying one's own design. Talking to another model chopper builder is one of the most powerful inspirations as well as a chance to share experience and profit from each other's mistakes and successes. Gene Rock and I almost play leapfrog with our designs. He sees what I have designed, then goes home and designs a better one, using new ideas. I see how his turns out and design my next one better, using some of his ideas and new ones of my own. And so on.

Bearing Source: New Hampshire Ball Bearings, Inc. (Eastern Regional Office, Plainview, N.Y. 11803) has a complete line of ball bearings and rod ends from instrument to large size, commercial to aircraft quality. Jerry Beard has assured me they will gladly handle small orders for model builders.

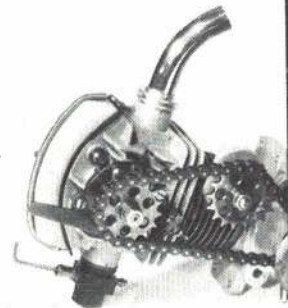
Fast Blade Carving: Carve a dozen blades without one stroke of knife or plane—by using a bandsaw! And do it in a quarter of the time. After gluing up blanks and cleaning off the hard glue beads, clamp a block on the bandsaw table near the blade and tilt the table to make one of the cuts shown in the sketch.



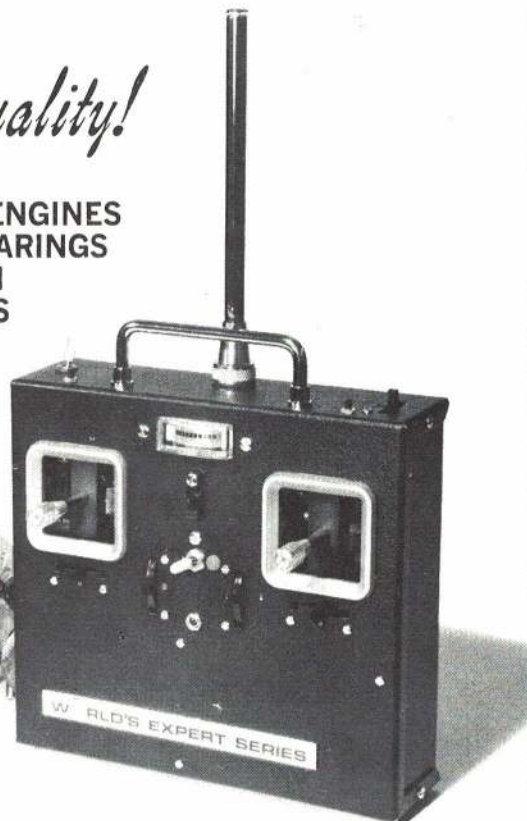
Make that cut on all blanks. Set angle and spacing to make the next cut and run all blanks through. For a flat bottom section like the Clark Y, five saw cuts bring a blank within easy sanding distance of finished contour. For full thickness from leading to trailing edges at the root end, lift up the blank as the sawblade nears that end. Going from root to tip direction, start sawing just outboard of the root and lower the blank down to the table. Don't let the saw grab it from your fingers. After sanding and dusting, a MonoKote covering saves time, strengthens the balsa trailing edge and covers a multitude of deep saw marks. Wrap it around the blade, overlapping 1/4" on underside of trailing edge.

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EXPERT SERIES

DUAL STICK

At the urging of Jim Kirkland, World Engines has come out with an Expert Series Digital control system. Jim is an advocate of the open gimbal stick. We developed a single stick system for Jim. While we were in the business of open gimbal sticks, we also developed this dual stick version shown in the photo above. Developing a product of this type is a pleasant manufacturing exercise. Why? First of all, we decided to put everything that we could conceivably come up with into this system on a price-be-damned basis. On the sticks the question came up as to the type of bearing so, rather than plastic bushings or bronze bushings, we went with ball bearings. Then the question came up about a roll button. We decided to put a roll button in. Then we put in a pot so you could determine whether you want the model to roll to the left or the right. These hurdles were passed on the single stick version without too much trouble. On the dual stick version the question came up—does the man want the roll button on the right or the left, particularly since he may change the mode of the transmitter. Therefore, you will notice that our dual stick has two roll buttons. Our sticks are made with stops so that the stick does not go all the way to the window. How do you like the jazzy windows on our transmitter? These die castings were done for us by Supertigre in Italy.

Warm Up

You may have noticed at many contests some model builders want to get their set turned on 20 or 30 minutes before they fly so they can take the top charge off their nickel cadmium batteries. This overcharge can be responsible for 5° of trim drift. In our Expert Series we use a 12 volt nickel cadmium battery power source inside the transmitter. Certain sections of our circuitry are serviced by a special voltage regulator operating in conjunction with a zener diode. This insures the exact voltage to the encoder to keep trim positions exact.

Our Expert Series System is a high priced system. We have to put in features and quality into this system to justify the price. Because of this, this equipment will be a little bit on the exclusive side.

Also on the exclusive side is a one of a kind 4 cycle engine pictured in the ad above. We will give you a little more information on this engine in our next ad in American Aircraft Modeler.



JIM KIRKLAND WINS THE TANGERINE USING AN EXPERT SERIES SYSTEM CONSISTING OF A TRANSMITTER, RECEIVER/DECODER, AND SERVOS, ALL BY WORLD ENGINES.

Perfect Finish with A Brush?

(continued from page 57)

feather in the next night with sandpaper.

Sketch out your trim design to make sure it suits the shape of your plane. If you can avoid touching or overlapping the different trim colors, you will be able to mask and paint the trim all in one operation. I have found that plastic electrical tape is best for this. A buddy of mine chucks the roll into his lathe and cuts it in 1/8" wide rolls for me. It is economical and you can follow any radius curve desired.

I paint my trim with a 1/4" brush and do not heat the paint, for as long a flow life as possible is needed on this. Again apply as many coats as necessary then remove the tape immediately. This allows the edges to flow into a nice smooth ridge.

After the trim is dry, apply any decals or details you wish. When the decals are dry, very thoroughly clean the plane as before. The finishing touch is coming up—one more coat of very carefully applied clear over the entire plane. I always mix up a fresh batch for this step. After it is mixed and has set for 45 min., thin it about 10% and strain it into a clean jar through one of your wife's nylons. Use a new brush to flow on this last coat. If you have done your clean-up job properly you should have few bumps left.

About now you are thinking, "I've always heard you don't have to use clear over Hobbypoxy, now this nut says to do it; whom am I suppose to believe?" Well, you're right—you don't need clear to bring out the gloss, but if it is not used you do need to exercise considerably more care in applying your color coats to avoid those nasty bumps. Be sure to strain your colors into a clean jar immediately before using and vacuum your plane between coats. I should point out that if you use clear over white it will cause a slight yellowing. I personally do not find this objectionable—in fact on a scale ship it can be used to give an appearance of age which is more realistic than a brilliant white.

Believe it or not, you're finished! Unless you're going for the super "knock 'em dead" contest finish. If so, brush on one more coat of clear and allow 48 hours drying time. Wet sand very lightly and very wet with No. 600, rub out with DuPont white rubbing compound and wax with a good paste wax.

When you get up the nerve to fly this beautiful beast you are going to ding it eventually. If there is enough airplane left, paint the repair job as before but, where your new color overlaps the old, clean your brush out and dip it lightly in thinner, feather the edge of the fresh paint out over the old polish when dry. You probably won't be able to find the spot let alone your "knit-pickin'" old flying buddies."

Sure it was a little work, but you have a finish that will stay beautiful right up to that last figure "9" and you did it all with brush and a little elbow grease.



WORLD ENGINES

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Getting Started

(continued from page 16)

One more feature of plugs we should consider is their "heat range." Glow plugs are offered in a rather large range of heats running from hot to cold. Each engine manufacturer furnishes the plug he considers best for his particular engine. For certain uses, however, some modelers find different heat range plugs superior. This is a matter of experiment to be undertaken only by the experienced flier. Incidentally, "hot" plugs are normally used in small engines, while the larger engines tend toward the mid or cold end of the range. The modeler cannot tell whether a certain plug is hot or cold just by looking at the coil of wire. Manufacturers differentiate between the various heat ranges they produce by cutting one or more rings on the glow plug top terminal. A few make the differentiation by packing them in different colored containers. However, the plug itself must be marked so it can be recognized when removed from the container.

A few years ago many of even the best imported engines were sold without any glow plug at all, though the manufacturer did suggest the proper type to use. This was not done to save a few cents on the plug itself, but rather was concerned with matters of U.S. Customs duties. However, now just about all imported engines come equipped with plugs.

The battery used with glow plugs is an important item. Not only must it have the power to cause the proper glow in the engine cylinder when starting, but it must be of a voltage roughly matched to the plug itself. Many modelers utilize two No. 6 dry cells connected in parallel. This, of course, gives less than 1½V at the plug terminals, but is sufficient for most uses and the life is fairly good. Others use 2V storage cells, which are rechargeable and thus can have a long total life. Since 2V is too high for practically all plugs and will lead to burn-out, several extra feet of connecting wire must be used between the plug connector and battery. This acts as extra resistance and reduces the voltage at the plug to a more reasonable value. It is difficult to specify how much wire should be used—it is a matter for experiment. Most modelers use household "twin lead" to attach the battery to the plug connector.

The third type of battery in wide use is the nickel cadmium. These cells produce only about 1.2V under the load of a glow plug, which is not high enough to offer any danger of burn-out. They may thus be used with practically no connecting wire at all—just a couple of clips attached to the battery terminals. This makes a very handy and compact starting cell. Even a small 2-5 ampere hour nickel-cad cell will give very good life in this application.

How does one tell when a glow plug is reaching the end of its useful life? Often a first indication is difficult engine starting. Remove the plug from the cylinder head and take a look at the business end. Attach the plug to a

NEW PILOT ARTF'S



GUILL \$39.98

This sharp looking aircraft is designed to fly on elevator, rudder, and motor. It is a relatively large 3 channel airplane, 52½" span. The manufacturer recommends a 20 but would probably fly on a 35 O.K. Nice vacuum formed fuselage, balsa elevator, molded foam wing with solid dihedral brace. Model also includes steerable nosewheel. A little larger than the Pilot Cherokee and Olympia. Worth the additional \$5.00.



MINNOW FORMULA I \$69.98

This model features the same type of vacuum formed fuselage and foam wing construction used in the popular Pilot Cavalier. The wing span 49.6". Length 39.37" (1 meter). Wing area 461 sq. in. Engine 4 cu. in. Weight approximately 5 lbs. This is almost ready to fly pylon racer with racing lines, wheel pants, should make active pylon racing possible for the modeler too busy to build. This is particularly important in this rugged event.



PHANTOM \$18.95

The Phantom is an almost ready to fly U/Control model constructed of vacuum ABS plastic and wood. A very striking looking sidewinder. Wing span 25". Length 25". Wing area 192 Sq. in. Recommended engine 15 to 19. Flying weight approximately 1.35 lbs. Here is a chance for some U/Control flyers to enjoy the advantages of an A.R.F. package.



BEAT-X \$13.98

This is a U/Control combat trainer for a 20 engine. Wing span 30". It is a composite wood and vacuum formed aircraft. Even the name is a ringer.



STOL \$4.95
71" SPAN R/C

This glider is the Pilot Thermal's little brother. Foam wings. Vacuum formed fuselage with a plywood pod. Manufacturer recommends an .06 engine. .049 engine would probably work well.

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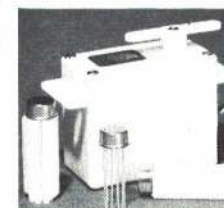
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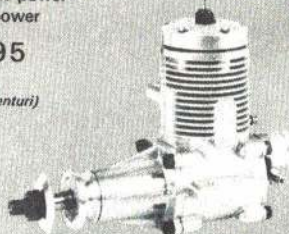
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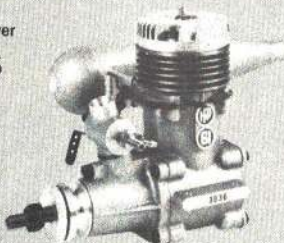
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starting battery and note the appearance of the glow. On well-used plugs you will hardly see any glow, just a tiny puff of smoke as the oil burns off the plug end. After a plug has been in use for some time, the business end becomes so coated with oil that often the turns of wire in the heating coil are not visible. Since it is practically impossible to clean used glow plugs, they are useless and should be discarded. After a glow plug has been in use even a short time, the coil of wire becomes quite brittle and generally cannot even be re-centered in the plug body without breakage.

The wire used in the glowing coil should preferably be platinum, however, due to cost, iridium and many other adulterants are used to keep glow plug cost within reason. Normally a glow plug will last in sport use a good number of hours before needing replacement, but in model racing activities, where engines are run at the absolute peak, it is not unusual to use a new plug for every flight.

It can be seen, therefore, that the glow plug is more than just that little gadget at the top of the engine. If you select the plug for your engine carefully, and treat it carefully (do not apply over-voltage) it will normally give long and very satisfactory life.

Editor's Note: This is the last of Howard McEntee's excellent series on *Getting Started in RC*. AAM has now published nearly 50 parts in this series all from Howard. As most modelers now know, Howard died early this year. Publishers of AAM offer one booklet of reprints of his articles noted elsewhere in this issue. Beginning next month, Jim McNerney, modeler and RC technician par-excellence (he fixes lots of radios), will take over the series.

On The Scene

(continued from page 12)

Juniors were automatically entered in the Junior event when they entered their efforts in any other category. Best of Finish was judged separately and the viewing audience turned in their ballots to select the Best of Show.

A number of manufacturers were showing their products. Of particular interest were the great strides being made in glider kits and hardware by many of the smaller N.W. manufacturers.

Also on hand was Ken Willard with his Wavemaster. The kit was being shown and it received much interest after Ken showed the television films taken from it—an outstanding movie put together by Lockheed Aircraft demonstrating remote control of flying objects where the pilot cannot see the object he is piloting, only viewing the terrain by means of a TV system. This is the type of public relations work that needs to be done to upgrade our hobby. Many "home" movies were run continuously during the two days, all taken by modelers recording their efforts. I couldn't help but marvel at the excellent photography in most of them. If

(continued on page 72)

Long Tom

(continued from page 52)

of the fuselage, trimming off a little excess length on the bottom piece when the cement has dried. Also round off the top edges only, as shown, with fine sandpaper. Cut decking piece F and underfin G from 1/16" sheet and cement in place (Fig. 5). Build the small radiator from two laminations of 1/8" sheet sandpaper to shape and cement to the bottom front of fuselage. The radiator perks up the appearance and makes a useful place to conceal some nose-weight should it be necessary.

Take a 10" length of .045-gauge piano wire and bend the undercarriage to the shape shown in the first stage of Fig. 6. This shape is obtained from the front and plan views. Then hold the U/cart in a vise, bending the U-shaped portion over. See second stage in Fig. 6. Cement the undercarriage in place on the bottom of the fuselage. Cut piece M from 1/32" sheet and cement it into the U-shaped portion. Lock the undercarriage in place with a piece of silk or nylon (N), cementing generously.

Place 1" dia. lightweight plastic wheels on the axles and retain with small lengths of electrical tubing which has had the center wire core removed. See that the tubing is a tight fit on the axles. Cut out two wing mounts (H) from 1/8" sheet and cement in place on underside of fuselage—the side view gives the exact position. Cut two lengths of 1/16" dia. hardwood dowel, insert through the cutout wing mounts and cement firmly in place. Insert a length of 3/32" dia. dowel through the holes at the rear of the fuselage.

Cut the tailplane and fin from 1/16" sheet and round off all edges with very fine sandpaper. Cement the tailplane in place, checking that it is at right angles to the fuselage. Cement the fin into the fin slot in the center of the tailplane, and also to the tailplane centerline. Again check that it is upright and at right angles to the tailplane.

Make the removeable rear-plug J from a piece of 1/16" sheet and two small lengths of 1/8" square strip, making sure it is a snug fit. Make the nose block from 1/8" sheet laminated together. Cement a piece of 1/16" plywood to the front surface. Drill a hole carefully through the block and insert a length of aluminum tubing, ensuring that it is a tight fit. Form a hook in a 3" piece of .045-gauge piano wire. Pass the shaft through the tubing from the rear of the noseblock and slip onto the shaft a couple of cup washers and a 6 3/4"-7" dia. plastic propeller (Kaysun or one similar, obtainable from your hobby dealer). Finally, with a pair of sharp-nosed pliers, form the winding loop and prop drive. Put a drop of oil on the prop drive shaft and see that the propeller revolves freely.

For the wing, cut two pieces 3 x 10" from straight-grained 1/16" sheet and cement to each piece a strip 1 x 10". Trace the wing panel shape from the plan and transfer it to the balsa sheet, marking in the rib portions on the

undersurface. Remember to make a right- and a left-hand wing panel. It is surprising how easy it is to make two of the same—we've done it!

Cut out the ribs, making two of each. Cement the ribs in place on the undersurface of the wing, curving the wing panel to the rib outline. Use paper clips and modeling pins to hold the ribs in position. Cement the root rib (R1) at an angle, using the root rib jig L as shown in Fig. 7. When dry, sight along the wing panels from the front and from the tip to see that they are free from warps. If there is a warp, hold the panel in a jet of steam and twist it out. Remove from the steam and continue to hold in position for a minute or two. Smear cement on the root rib R1 of one wing panel and pin it flat on your building board. Put cement on the root rib of the other wing panel and join the two root ribs together, but raise the second panel up onto the dihedral jig K and pin in position as shown in Fig. 8. When dry, remove the completed wing. The wing fits against wing mounts H and is held in position by two 3" long rubber bands, running beneath the wing and over the front and rear wing dowels.

Do not use dope on your Long Tom. If you wish to decorate it, use oil pastels—purchase a small box from any art shop. Just apply to the balsa wood, and then rub it evenly into the surface with a clean soft rag—that's it! Very easy, quick and colorful, with no added weight. Masking tape can be used with this method of color trimming for those clean, crisp lines. Control surfaces and other markings can be put in with ball-point pen. Long Tom is now finished except for motor installation and balancing.

Take a 42" length of 3/16" wide flat rubber strip, and the same length of 1/8" wide flat rubber strip. Tie both lengths into a loop. Apply some rubber lubricant to the loops, and drip them down through the fuselage from the nose to the rear end. Remove the rear plug, anchor the loops at the rear with the anchorage dowel, and slip the front of the loops over the hook on the propeller driving shaft. Replace the rear plug J. Tie a length of thread to a modeling pin and push the pin into the decking piece F at the point of balance shown on the plan. Suspend your model by the thread—it should hang level. Our original Long Tom, shown in the pictures, needed no trimming weight, but if you need a little extra either in front or rear, you can easily conceal it cemented to the rear plug J, if the model is nose heavy, or neatly in the radiator opening, if it is tail heavy.

Flying

Test glide over soft grass on a calm day. Point the model into any breeze that may be blowing and launch from about shoulder height, with the nose slightly down. Long Tom should glide straight and land about 25 to 30 ft. ahead of you. If it dives, remove some weight—if you have any—from the nose, or add a little to the tail. If the model stalls, add a little more weight to the nose. The design of Long Tom is such that you should need little trimming

weight, if any at all. If the model turns sharply to either left or right, gently bend the rear edge of the fin towards the direction of the turn. When the glide path checks out, we can try a power-on flight. Wind on about 150 turns and try a short hop. Long Tom should climb away from your hand, probably turning very gently to the left. When the turns run out, it should settle into a flat glide. It is most unlikely, but if, under power, Long Tom climbs steeply and then dives, stalling insert a 1/16" square strip between the top of the noseblock and the fuselage. If the opposite occurs, add the strip between the bottom of the noseblock and the fuse. With each successful flight increase the number of turns by 25. A safe maximum on this test motor is about 300.

With Long Tom flying well, replace the test motor with the flight motor. This consists of a 64" length of 3/16" wide flat rubber strip and the same length of 1/8" wide flat rubber strip. Again, tie the ends of the rubber and make two loops. Lubricate well and install. This motor, when it has been run in (after about a dozen flights, increasing the turns with each flight), will take about 820 turns. These are best applied with a geared winder—a hand drill with a winding hook inserted firmly in the chuck—stretching the rubber motor, slowly coming in towards the model as the turns are wound. After about 230 winder turns, you will be thrilling to long flights at a good height, so do give yourself some space, please!

The more experimental-minded modeler might like to try replacing the commercial plastic prop with a curved balsa propeller, incorporating a simple free-wheel device. You will probably need to step up the power a little for this. Experiments with a steady flier like Long Tom can be instructive and rewarding.

Long Tom is certainly an out-of-the-rut model and we think you will have a lot of fun building and flying it. If you do, we would be pleased to hear about your experiences.

Materials List

2 sheets 1/16 x 3 x 36" balsa wood (grade B)
1 sheet 1/32 x 3 x 24" balsa wood (grade B)
1 sheet 1/8 x 3 x 18" balsa wood (grade B)
6 strips 1/16 x 1/16 x 36" balsa wood
18" length .045 gauge piano wire
1" length Aluminum tubing, .045 ID
1 pair 1" dia. plastic wheels
1 piece Silk or nylon
3" length 1/16" dia. hardwood dowel
2" length 3/32" dia. hardwood dowel
1" length Electrical tubing
2 cup washers
1 small piece 1/16" plywood
two 3" long elastic bands
9 feet 3/16" flat rubber strip
9 feet 1/8" flat rubber strip
1 tube Rubber lubricant
1 tube Balsa cement

Miscellaneous items: Paper clips; modeling pins; tracing paper; soft pencil; ruler; set square; building board; oil pastels (optional); masking tape (optional).

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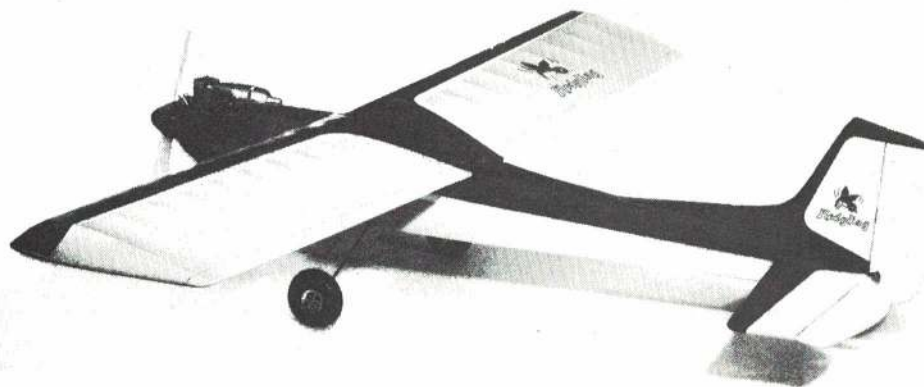
... AND ABOUT THE KIT ITSELF . . . Fuselage sides are one piece with ply doublers back past the wing. Only 3 bulkheads and a carved top make for almost "instant fuselage." Torsion main gear & sprung nose gear (or fly it as a tail dragger). Aluminum engine mounts, etc.

The complete wing is built on the work bench without having to remove it which eliminates warps — All parts are die cut, carved, etc. Balsa sheet cover keeps warps out and makes for a tough wing . . . Tapered Strip Ailerons are simple to install. Wing is installed just like the low wing jobs, using dowel pins and nylon-screw in maple nut-block, like it ought to be. No rubber bands to deteriorate or slip or tear up.

Rudder and Fin are sheet, Stab is built up and sheet covered to keep it flat . . . so that's it, a fine kit of a fine ship.

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Denight Special

(continued from page 27)

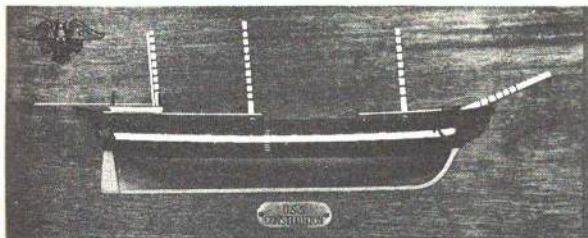
were applied to this RC design. RC racing has progressed so fast, yet simultaneously with other types of RC, that many of us have done things which we knew were not the ultimate, expediency being the excuse. Hanging an engine onto a racing model in the same way we do a sport job is not the best way if you are looking for the ultimate in performance from the engine. The Denight uses all the cute control line tricks for its power unit and, happily, they have all proven successful. However, you have to understand them to appreciate what they are intended to accomplish. All of my Formula I models have

been considerably underweight according to the rules requirement. I am of the "balsa flies better" breed and find it hard to accept a rule which forces us to add ballast to an otherwise perfectly acceptable machine, just so that those wishing to use different materials will have competitive models. Anyhow, having a half pound of weight to play with, an attempt was made with the Denight to put it to good use. The current scuttlebutt is that an engine's efficiency is proportionate to the solidity of its foundation. So, the Denight makes extensive use of plywood and good hard maple in and around the engine department. Use of these heavy materials is actually an asset, for without them the removable

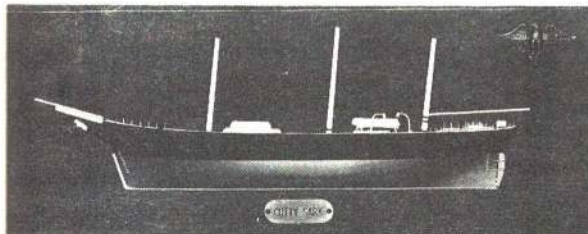
pod would be highly impractical. The pod has proven to be a distinct asset for maintenance and experimental purposes. When it lifts off, you have the entire power unit out of the airplane and any changes desired become much easier to accomplish. Both the engine and fuel tank, with the associated plumbing, are fastened to the heavy maple crutch.

The full-scale Denight, at various times during its life span, used an air intake scoop on its lower engine cowl. This was just the excuse we needed to put another trick to use—one which should provide better engine performance and add to the efficiency of the model itself. Basically, this pressure cowl requires that the cylinder and head

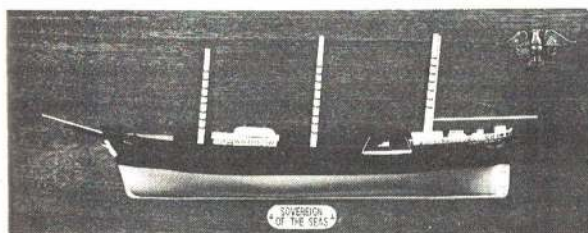
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be completely enclosed in a tight-fitting ducting in such a way that air is rammed through the cooling fins. With the inverted engine configuration and the full-scale Denight carburetor air intake scoop, the necessary requirements were there to use a pressure cowl on our model.

The pressure cowl principle takes what once was a detriment to aircraft and turns it into an advantage. Before it was developed, any sort of ducting used to accomplish heat exchange (engine cowlings, oil coolers, radiators, etc.) simply added to the drag of the aircraft. With the advent of the pressure principle, this drag was nullified or, in optimum cases, actually reduced the overall drag of the machine. Fortunately, it has

proven to do the same for our models!

The principle is this: the source of heat is sealed in a duct work so that the only leak is an air intake and an exhaust. The intake is purposely made 25 percent larger than the exhaust. The angles of the walls of both the intake and exhaust ducting—from entrance to exit of each duct—is never below a minimum of seven degrees so that back pressure in the ducts will not be created.

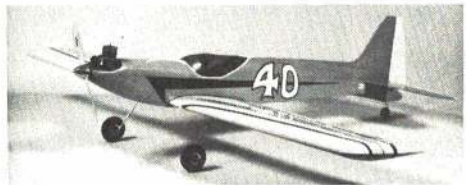
In operation, the air is rammed into the intake duct and a bit of back pressure is built up at the exhaust exit because of its smaller opening. Immediately in front of the exhaust exit, and in the back pressure area, is the source of heat—in our case, the engine cylinder. The air is held in the cylinder area

momentarily, allowing it to raise in temperature and expand. The incoming air pressure being greater causes this expanded air to leave via the exhaust duct at a *greater velocity* than the air entering and the air flowing past the airplane. The result is a rudimentary jet effect which adds thrust to the aircraft. A secondary advantage is that this system tends to create a constant operating temperature for the engine. It operates as expected in the air, with no problems; there is some tendency to overheat with prolonged engine runs on the ground. At first, this seemed a problem but the cure proved simple. If you anticipate an extended running period on the ground after you peak the engine

(continued on page 95)

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On The Scene

(continued from page 68)

they could be put together and properly narrated, what an hour-long TV spectacular the AMA would have!

An admission was charged those not entering models (modelers paid an entry fee per model entered) with which the RAMS pay the expenses that are incurred. There was a continual stream of people through the hall both Saturday and Sunday, as modelers traveled for hundreds of miles to participate and view their compatriots' work.

Each year this Symposium demonstrates the upgrading that is going on in the modeling field. Don Topel, The RAMS Club Chairman for this year's event, displayed the leadership always prevalent in putting on the "kick-off to Spring" as I like to call it. Thanksgiving usually sees the last active flying around here and most modelers settle into the routine of building. This building is generally pointed to the RAMS Symposium; with it tucked away on film and in one's mind the spurt towards spring begins.

So Long

(continued from page 20)

Construction

All wood sizes are identified on the plan and when wood is selected for construction it should fit its load requirements as follows:

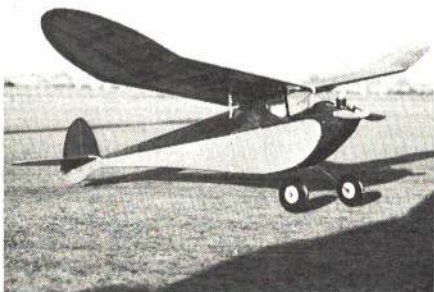
- Wing L.E.—hard
- Ribs—medium
- Empenage L.E.—medium
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- All Spars—medium
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- Bulkheads—soft
- Sheet Covering—soft

Bill of Material

- 6 ea - 1/16 x 1/8 x 36
- 3 ea - 1/8 sq. x 36
- 2 ea - 3/32 sq. x 36
- 1 ea - 3/32 x 3 x 36
- 2 ea - 1/16 x 3 x 24
- 1 ea - 1/32 x 3 x 36

Look into your scrap box for items not listed above and you'll probably find them.

The fuselage is the only area where you have to read the instructions quite carefully. Once completed, the fuselage is very rugged, but until it is fully sheeted, care must be exercised to insure proper alignment. Note that the



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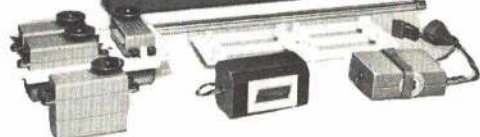
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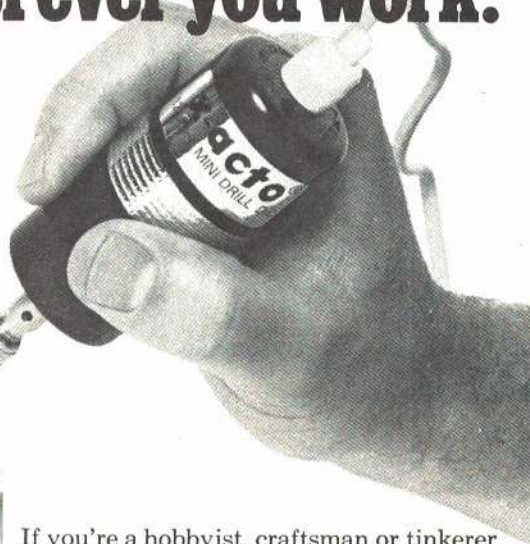
firewall has down thrust built in to it—this is important, as is the zero-zero alignment of the wing and stab mounts.

The plan shows the fuselage construction sequence. It is designed to minimize alignment problems. The following description plus the illustrations and some patience should make the task a pleasant one.

Build the crutch using hard balsa for the longerons. Glue the bulkheads (don't forget the lightening holes) to the crutch. Glue the wing mount in place, and then add the top longeron. Eyeball everything carefully to make sure nothing is twisted.

Prebend the 1/16 sheet fuselage bottom before attaching it to the bulkheads. This is important if alignment is to be maintained. There are two methods to accomplish the preshaping. One is the time-honored tea kettle and its finger-cooking steam method—very effective, but sometimes painful. Another method, which should appeal to the more scientific-minded practitioner of our hobby, is to soak the wood for 30 min. in household ammonia. After this treatment the wood becomes very pliable and sets permanently whichever way you bend it. (A gas mask is quite useful in this technique, but if you can hold your breath for a long time you'll be alright.) With the bottom sheet properly shaped and the bottom longeron glued to it, carefully glue the assembly to the bottoms of the bulkheads. Here again, eyeball the alignment so that twists are kept out. When dry,

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So Long

(continued from page 73)

install the landing gear, gussets, doublers, wing and tail wire hooks, etc.

Begin sheeting at the front and work back to the tail. Refer to the plan for grain direction. The last pieces to go on are the bottom—rear of the fuselage. Note that bulkheads 3 and 4 have 1/16 square strips glued even with their out-lines. This is to provide more glue surface at sheet joints. Attach the sub-rudder and begin with the sandpaper—a neat job will pay off in weight saving and flight time. Make sure you didn't forget to put the blind nuts in the fire-wall for the engine screws.

For the wheels cut lightening holes in the 1/16 plywood core. The instructions for the building of the emperage on the plan are self-explanatory, and you will find that the leading edges of both the rudder and stab require one of the prebending treatments mentioned before.

Multi-spar wings are pretty much the order of the day. The plan shows only the bottom forward spar because it is positioned on the plan during construction, as this helps to keep the ribs in proper alignment. It should be reinforced with the 1/16 x 3/8 spar brace at the center section as it and the trailing edge are the only things that make contact with the wing platform. The brace keeps the spar from being crushed. Spar connections at dihedral breaks are left to individual taste. I prefer overlapped spar joints for ease of construction and strength.

The entire model is covered with Jap tissue and gets four coats of thinned dope (60/40). It is advisable to use a plasticizer in the dope to prevent or at least reduce warps. The windshield and bay windows are installed after the ship is covered. Finished weight should be 4-1/2 to 5 oz.

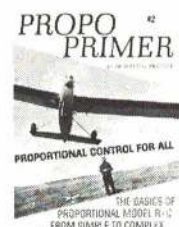
Flying

The ship should balance at 50 percent of the wing chord. If alignment has been kept true and there are no warps, then a hand glide will be straight and flat. First power flight should be with the prop on backwards and the engine running rich. Increase power very slowly as test flights proceed. The power pattern and glide are both to the left. Because of this left/left pattern you'll have to be careful in the beginning not to wind in under power. I've built two of these mini-So-Longs and they have flown identically with identical adjustments. In each case I've used a wedge tab under the left wing to keep the tip from dropping too much under power. Once you locate its groove, the ship is extremely stable.

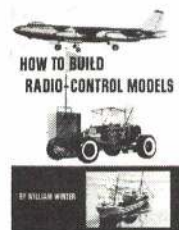
Under full power, it should spiral up and not hang on its prop. A straight-up climb will kill altitude and foul up the power/glide transition. When fully trimmed, put it on its wheels and try an unassisted takeoff—it really charges into the air. Don't forget to light the fuse.



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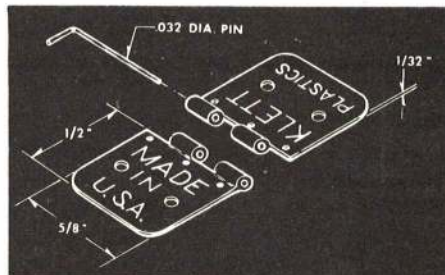
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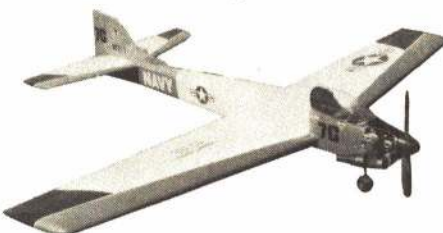
(continued from page 23)

The primary production version of the "Blitz"—the Ar-234B—entered military service in September 1944 when the Allies were crashing through France on their way to Germany. At first, operations were limited to photo-recon runs, but soon the Arado jet was making use of its ability to carry more than 3000 lbs. of bombs. While its offensive career was rather limited, the Ar-234 was probably the world's first jet bomber. Lacking enough of them to make meaningful bombing attacks, the Germans concentrated their few Ar-234's on reconnaissance missions through the end of the war.

With Allied heavy bombers making it exceedingly difficult to maintain production in Germany's aircraft factories, and the lack of good fuel and good pilots only adding to the problem, it is surprising that so much effort was channeled into experiments. But the Ar-234 must have been a good platform on which to test new ideas, for quite a variety was planned. The Ar-234V-16 was intended as a test vehicle for what would have been the first crescent wing. The plane was never completed, but years later the graceful crescent-winged Handley Page Victor joined the RAF's Bomber Command. The V-18 was proposed for testing one of the very first swept wings, while the V-26 and V-30 were to have been used for experimenting with laminar flow airfoils, which the Germans had learned about from captured P-51 Mustangs.

One of the most intriguing variations on the standard Ar-234 layout was the four-engined versions. Needing more power than a pair of rather crude turbojets could provide, the Germans tried

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doubling the number of engines. The V-6 had four separate engine nacelles (and looked like an airplane several times its actual size), while the V-8 had a pair of engines grouped under either wing. A whole series of four-engined Ar-234C versions was planned, but of 14 airplanes begun, few were completed and none is known to have flown.

The basic Ar-234 was a single-seat airplane, but some were to have been built with two seats and one late model was to have carried a three-man crew. Despite its appearance, the Ar-234 was a small airplane, especially for a bomber, having less overall size than any of the standard twin-engined, prop-driven fighters used in that period. The final version of the Arado was to have been the Ar-234P series, a stretched version with a more conventional windshield and nose, but none was completed. Despite the nearness of the Nazi collapse, three different makes of engine were to have been used in versions of the Ar-234P, with some having two engines and others four.

For so many reasons, the '234 was never fully developed. While it was one of the least known German combat types, its record was sufficiently promising to make one wonder just how good it might have been. After the war, at least one was tested by the USAAF at Wright Field, in Dayton, Ohio. The final report on the airplane is generally very complimentary:

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But it was not a perfect airplane, according to American pilots who flew it. "Because of the extremely narrow landing gear and poor brakes, directional control on the ground is hazardous. Vision is somewhat distorted by the curved plexiglass...rear vision is blocked completely, and mirrors must be used to see the wings, turbojets or flaps."

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one is known to exist today: an Ar-234B owned by the National Air and Space Museum, and stored at Silver Hill, Maryland. The airplane is complete and contained in several crates. Hopefully, it can soon be removed and assembled, so that the public can see the world's first jet bomber.

Dimensions:

Length—41' 5½"
Wingspan—46' 3½"
Height—14' 1¼"
Wing Area—284-1/6 sq. ft.

Performance:

	Ar-234B-2	Ar-234C-3
Maximum Speed	461 mph	530 mph
Maximum Range	1013 mi.	765 mi.
Service Ceiling	32,810'	39,730'
Empty Weight	11,464 lb.	14,400 lb.
Gross Weight	21,715 lb.	21,800 lb.

Versions and Variants

Ar-234V-1—first prototype, flown June 15, 1943 with Jumo 004A engines.

Ar-234A—production version with dolly-type landing gear; cancelled.

Ar-234V-9—prototype of Ar-234B (wheel landing gear), flew March 10, 1944.

Ar-234B-0—pre-production version; first flew June 8, 1944; 13 built.

Ar-234B-1—production reconnaissance version.

Ar-234B-2—built as recco, bomber and pathfinder; 210 B-1 and B-2 built.

Ar-234V-13—Ar-234C prototype with 4 BMW 003A-1 engines; flew August 1944.

Ar-234C-0—production prototype.

Ar-234C-1—recco version; never operational.

Ar-234C-2—bomber version.

Ar-234C-3—bomber night fighter/ground support; few produced.

Ar-234C-4—recco version planned with 4 BMW 003C engines.

Ar-234C-5—two-seat bomber; not built.

Ar-234C-6—long-range recco; not built.

Ar-234C-7—two-seat night fighter with Heinkel-Hirth HeS 011 engines; not built.

Ar-234C-8—single-seat bomber with Jumo 004D engines; not built.

Ar-234D-1—recco with two HeS 011 engines; not built.

Ar-234D-2—bomber version of Ar-234D-1; not built.

Ar-234E—heavy fighter version of Ar-234D; not built.

Ar-234P-1—stretched night fighter with 4 BMW 003A engines; not built.

Ar-234P-2—similar to Ar-234P-1; not built.

Ar-234P-3—with 2 HeS 011 engines; not built.

Ar-234P-4—P-3 with Jumo 004D engines; not built.

Ar-234P-5—three-seater with 2 HeS 011A engines; not built.

Wrong Way Junkers

(continued from page 43)

It will also be necessary to build up the leading edge for a distance of about 1/3 span, starting at the root, in order to obtain the correct chord. Because of the method of construction Revell used on the B-47 wing, the easier sandwich method cannot be used. Instead, cement two lengths of sprue to the leading edge. Then the wing can be reprofiled and sanded to an airfoil shape. Before recontouring the wing, fill all seams and voids with putty and/or scrap plastic. Leading edge slots and trailing edge flaps can be cut in as on our model, or simply scribed in the correct position.

When mounting the wings to the fuselage, check to see the trailing edge of the wing is located about 1/4" above the lower fuselage line, and the leading edge is about 3/8" above the lower fuselage line.

Two of Lindberg's AR-234 kits provided the four engine nacelles required, however they need to be modified to a more circular cross section by filing and sanding. Since you will file through the nacelle at one place in the course of rounding them out, the nacelles are possibly the most difficult part of the entire model. But a little putty will easily plug the hole, and since this part mounts against the fuselage and wing, it isn't that much of a problem. A sufficient amount must be cut off the rear end of the nacelles to bring their length

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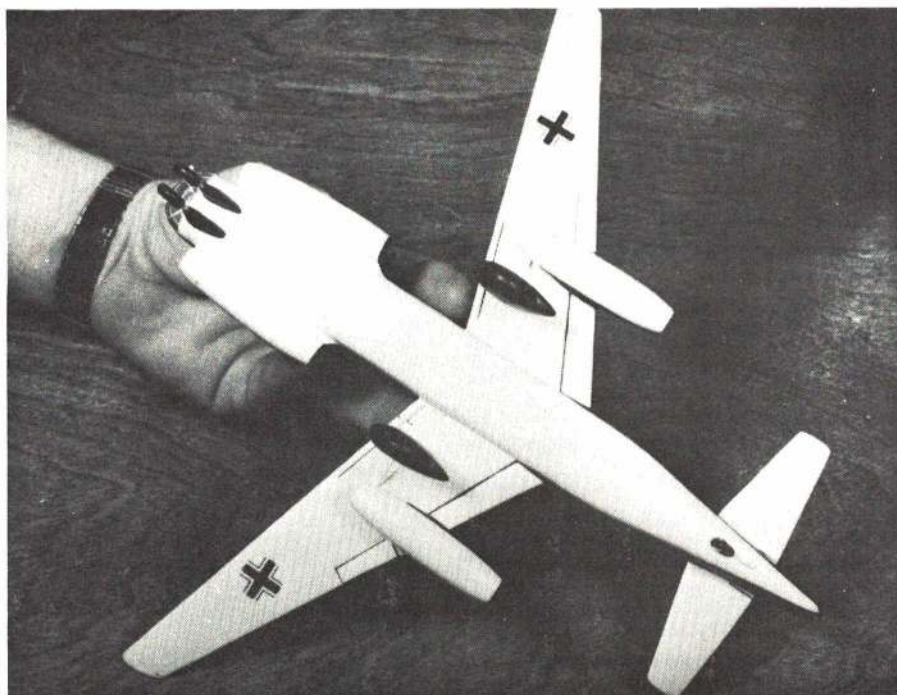
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down to exactly 2-1/8". The inlets and exhausts must also be more circular, which can be easily done by wrapping a piece of sandpaper around a 1/4" dowel and rotating inside the openings.

As a result of these modifications, new nozzle cones, 1/4" dia. and 5/16" length, must be made from plastic sprue. Cone angle is 40 degrees, and four are needed. These cones were used to control the exhaust velocities in the early engines by a forward and aft movement which in turn either opened or closed the nozzle area.

Mounting the nacelles to the wing and fuselage will have to be eyeballed. For the wing-mounted nacelles, the inlet should be kept 1/10" from the lower surface of the wing, while holding the nacelle centerline parallel with the wing chord. Once the wing nacelles have been cemented on, make the wing/nacelle fairings and cement them in place. Putty can then be applied and, when dry, sanded down to form a fillet. Fuselage nacelles are cemented in place with three degrees positive angle to the fuselage bottom and with a slight toe-in angle to the fuselage sides when viewed from the top. Be sure the inlet nests quite close (about 1/16") to the fuselage in doing this. The fuselage nacelle inlet should also be in line with the square window just forward of the blister when viewed from the top.

The main landing gear wheels were taken from a JU-52 kit, while the 3/8-in. dia. nose wheels were from the scrap box, as were the 1/2" long nose gear forks and 1/4-in. dia. tail bumper wheel. Main gear struts are from the JU-52, while the strut braces are stretched sprue, each about 8/10" in length.

The nose landing gear fairings are scrap plastic faired to a streamlined

shape and cemented in place. Their leading edges are 1/16" past the forward edge of the fuselage. *Note:* Measure this distance before installing the nose transparency.

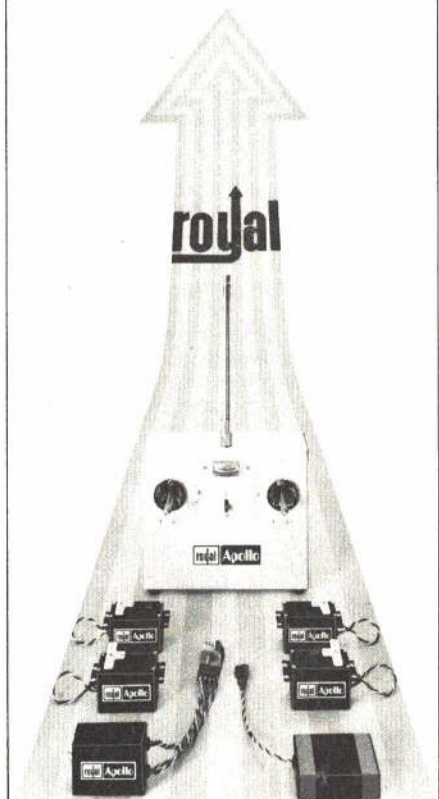
Some photographs show the JU-287 as mounting pants on the nose wheels. This is accurate enough—as far as it goes—but a letter from William Green stated that to his knowledge the JU-287 never flew with the nose pants in place.

Depending on the method chosen for obtaining the aft fuselage, the amount of weight needed to keep the nose down will vary. Regardless of the amount, an excellent place for the weights is inside the fuselage-mounted nacelles.

To make the little camera housing atop the aft fuselage, the periscope sight from the AR-234 kit is drastically filed down and cemented to a tripod made from stretched sprue. The two front legs of the tripod are 3/8" long, with a bottom spread of 1/8". The aft leg mounts 1/4" behind them, and on the fuselage centerline. Wingtip probes are made from stretched sprue and have a length of 3/4".

As for painting, the aircraft undersides are Pactra's Aero Blue, top is Dunklegrun (Dark Green) with some sections of the fuselage in Schwarzgrun (Black Green). The light colored area on the vertical fin is RLM-Grau. It shows up in most photos of the aircraft, and was apparently caused by a painter who missed a spot—or maybe he ran out of paint! Forward and aft sections of the nacelles (top sides only) are Pactra Steel.

Codes (RS+RA) are in 1/2" high black letters on the fuselage sides only. The black-white-black Iron Cross is applied on the fuselage sides and wing undersurfaces, but *not* on the wing uppersurface.



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AAM Commander

(continued from page 51)

a synchronization pause. This has the beauty that the decoder can be used with *any* transmitter whether it is one channel or eight. The decoder decodes the first two functions (or one if a single-channel transmitter were used) that arrive and then is held off for the extraneous pulses. Happily the first two are usually aileron and elevator. In general, then, the decoder could be used for a glider, car, boat, or plane as a second two-channel system operating from an existing transmitter. This is about as much flexibility as one can get from a decoder!

Assembling the Receiver and Decoder

We shall describe receiver construction first. As for the transmitter/servo construction, the instructions presented here are complete but have been edited heavily to put them in paragraph form. Fully-detailed instructions in check-off list format are available from ACE R/C which is kitting the system. Study the overlay drawing, Figure 5, and the following instructions carefully before starting construction. Wind coils L2, L3, and L4 as shown in Figure 6. Note the identification of the holes in the coil form as shown on Figure 5. Start with L2 because it is simplest. Grasp each end of an 18" length of No. 26 enameled wire with pliers and stretch until the wire takes a straight set. Insert one

end of the wire into hole No. 1 of the coil form. Working carefully, close-wind 16 3/4 turns counterclockwise viewed from the top; the last 3/4 turns should place the stop point over hole No. 2. One minor note: Do not count the turn until the wire passes over hole No. 1. Use 5-minute epoxy, coil dope, or sticky masking tape to hold the coil in the shape shown in Figure 6. Bring the end of the wire straight down through hole No. 2. Clip the leads below the form to 1/4 in. L3 is wound exactly like L2 and is the primary for L3/L4. Place a bit of tape over the side of L3 opposite its terminals. Close wind 2 1/4 turns of No. 26 enameled wire as tightly as practical around L3 at the location shown, i.e., two turns up from the bottom. Note that L4 is wound clockwise, viewed from top of the coil.

Enlarge the holes in the p.c. board which accept the IF can mounting lugs to 1/32" diameter. Install the components in accordance with the overlay, Figure 5, and in the order shown, observe these special instructions:

Use epoxy, contact cement, or (working carefully) hot melted glue applied with a nail to bond the coil forms for L2 and L3/L4 to the p.c. board, apply sparingly. The ends of the enameled wire for L2 and L3/L4 protruding below the board must be scraped free of enamel, bent over flat and soldered in steps 13 and 16. Be sure to follow the color code on the IF cans—yellow, white, and black. The tantalum capacitors must be installed with

the proper polarity (the plus end is colored red and/or marked "plus"; the proper position of the plus ends is identified as "up" or "down" in Figure 5). Finally, the crystal installed must match the frequency of the transmitter.

Once Step 39 is finished, inspect the completed receiver carefully for placement of components, scrub the bottom of the p.c. board with thinner using an old toothbrush to remove the solder resin, and compare the bottom of the board with the p.c. positive shown in Figure 7 to be sure there are no solder bridges.


The battery supply leads come from the decoder and will be connected during final assembly of the system. Temporarily connect 4" lengths of red and black wire to the positions shown in Figure 5 for the tune-up procedure to follow: Check the resistance between the red and black leads using a 20,000 ohms/volt multimeter such as a Heath-kit VTVM or VOM. The resistance should be around 1000 ohms.

Perform the following tune-up procedure if a scope is available as it is simplest and most fool proof: (a) Clip a 47k resistor lead to 1/4" and solder to the base (center lead) of Q6 on the p.c. land; (b) Connect the 4" black lead to OV and the 4" red lead to +4.8V (NiCads) or 6.0V (dry cells); (c) Connect the probe of an oscilloscope to the 47k resistor via a 10 uHy RF choke. Connect the ground lead of the scope to 0 Volts on the receiver p.c. board at the closest physical point to the 47k re-

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sistor, again, via a 10 uHy RF choke; (d) Position the receiver with the antenna dangling over the edge of the workbench away from metal objects. Be sure your soldering iron is not plugged in and/or lying near the receiver; (e) Remove the transmitter antenna. Turn the transmitter on and set the scope to 0.1 V/cm. Position the transmitter such that the signal displayed is about 1.5 cm; (f) As you perform the following steps, increase the distance between the transmitter and receiver to maintain the displayed signal at about 1.5 cm peak-to-peak. Do not touch the receiver or any of its leads while making these adjustments. Use a tuning wand or piece of dowel to hold the receiver down; (g) Using a non-metallic tuning wand, adjust T1, T2, and T3 for peak displayed output. Then adjust L1 and L2 for peak. Keep moving the transmitter away to maintain 1.5 cm peak amplitude. Run through the adjustments at least three times to insure that the receiver is peaked. The signal displayed must not be permitted to distort; (h) Check the stability of the local oscillator by placing your thumb across the crystal leads and removing it a number of times to insure that oscillation resumes. Remove the 47k resistor, the RF chokes used for the scope connection and the temporary red and black leads. The receiver is now ready for integration with the system.

If a scope is not available but a VTVM, or solid state VOM of at least 20,000 ohms per volt, is available, perform the above procedure using the lowest DC setting.

A satisfactory alternative, although it requires a helper, is as follows: With the transmitter properly tuned, connect the receiver to the decoder and plug in the servos. Check for operation, first with the transmitter antenna installed. One should have control of the servo even if the receiver is badly out of tune; then, remove the transmitter antenna and have a helper move slowly away while at the same time moving one control evenly back and forth. Use the steadiness of the servo as the tuning indication and keep moving back until the exact center of tuning for L2, L3/L4, T1, T2, and T3 is set to maximize range. The distance achievable with 9.6 volts on the transmitter and at least 4.8 volts to the receiver, should be between 12 and 16 ft.

If a range in excess of 25 ft. is obtained using any of the above procedures and is accompanied by any unwanted "jittering" as the transmitter is moved steadily toward or away from the receiver, the receiver should be "trimmed" slightly by increasing R23 (220 ohms) until steady operation is obtained with 12 to 16 ft. of range. If a range significantly less than 12 to 16 ft. is achieved but operation otherwise is alright (indicating that the receiver was properly constructed) additional range should be obtained *not* by changing R23 (because it is also part of the noise filter) but by reducing R10 and R13 to as low as 820 ohms.

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Decoder

Study the overlay drawing Figure 8 carefully before starting construction. Observe the following construction notes as the steps shown later on the overlay are completed in order: (a) The leads of the IC are spread somewhat. Press the entire row on one side against a flat surface to bend them in slightly, simultaneously; (b) If you choose to use a servo other than that presented for this system, the polarity of the control pulse required must be determined. (A negative-going pulse may be obtained by using the two lands marked with an asterisk adjacent to the positive outputs shown connected); (c) The jumpers should be made with short lengths of insulated hook up wire; (d) The servo does not require a center tap. However, a drilled land is provided for use with servos requiring a center tap. (e) Leave the leads for C2 (Step 6) 1/8" long above the board so that this disc capacitor may be bent over flat against D1 and C1. (f) Observe the 1N4148 diode, D1, carefully for location of the band and position the banded end as shown as the overlay; and (g) Observe the polarity of the tantalum capacitors (cylindrical) carefully. The red end is positive(+). (If Sprague capacitors are used instead of Components, Inc. pick out the end marked +.)

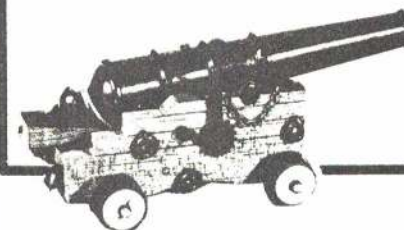
Install the components in the order shown on the overlay, Figure 8. Work slowly and carefully, check continually for possible solder bridges. Install the wires. Leave the wires for the receiver

free. Use dope thinner or alcohol and scrub all the resin from the p.c. board. Use the nail clips or small dikes to trim all leads 1/16" from the bottom of the board. Check the finished p.c. board against the p.c. positive Figure 9, for solder bridges.

Cable a 6" red and 6" black lead for power by twisting the two together tightly for the full length. Cable two sets of servo leads; one red, one black and one blue go in each. (If center tap servos are used, a white lead will be added to the power and servo cables). Clip the wires in each cable to equal length, strip 3/16" and tin. Tin the pins of the female half of two Deans 4-pin connectors and one male connector as shown in the servo construction instructions last month. Slip a rubber grommet over each of the three cables. Work with one cable at a time. Slip a 1/2" length of 1/8 ID heat shrink tubing over the cable. Untwist one inch of the cable and slip a piece of the sleeving provided with the Deans connector over each wire. Solder to the pins as shown last month. Slip the sleeving up over the pins and wires. This completes the decoder. There are no adjustments to be made. Connect the 3 in. red (+4.8V), 3 in. black (OV) and 3 in. white (signal) leads to the appropriate points on the receiver.

The builder may choose to connect directly from the receiver to a DPDT switch, then to the male power plug; to make the switch part of the battery cable; or to use a plug on either side of

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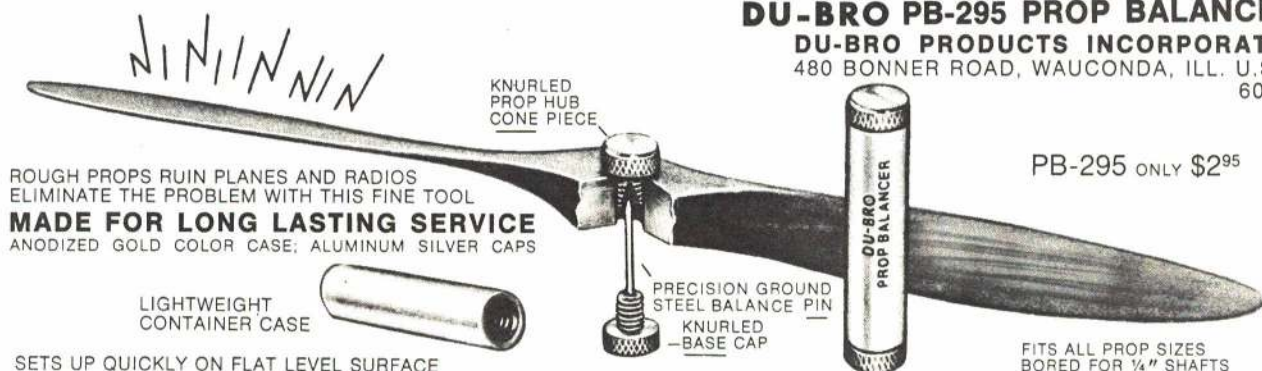
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the switch. It is a matter of personal preference. Our pilot units placed the switch in the power leads from the decoder. Just one power plug was used, on the battery end.

It is desirable to house the receiver and decoder in a plastic case since a metal case complicates RF tuning to the extent that L2 and L3/L4 must be retuned with the receiver in the metal case. There are several ways to come up with a suitable case: A vacuum formed ABS plastic case may be purchased from ACE R/C; the Controilaire case for the Blue Max fits; or an excellent case may be made from ABS plastic sheet. For example, scraps of the ABS plastic used for most ARF airplanes can be cut and welded using methyl-ethyl-ketone (MEK) provided with ARF kits. The inside dimensions are 1-5/16" side by 1-9/16" long, by 1-1/8" high. The preferred method is to cut a rectangle of plastic 3-9/16" by 3-13/16". Cut out the four corners and score the plastic with a sharp knife, bend the ends and sides up and "weld" together with MEK. Make a lid the exact outside dimensions of the top, then make a key the exact inside dimensions of the top. "Weld" the lid and indent "key" piece together. When the lid is held in place with tape, it keys the box and it becomes quite rigid.

Cut three slots in one end of the box to accept the three decoder grommets and drill a 1/16" hole in the middle of the other end for the antenna. Place the

receiver in the box with the p.c. board down. Tie a relief knot in the receiver antenna and thread through. Separate the receiver and decoder with a thin piece of micarta and 3/16" of foam. Set the grommets in their respective slots, set the lid in place and tape for maximum stiffness. The receiver-decoder is now ready for use with the Commander transmitter or any other transmitter on the same frequency.

AMA Council Meeting

(continued from page 102)

principle, with a specific proposal to be obtained by AMA HQ for testing, including costs, to be submitted for final council action in July. The motion passed unanimously, including agreement with a comment by Signorino that the proposal provide for flight tests, since only the latter would be likely to be accepted.

Engine Mufflers

Worth reviewed the problem from the modeler and industry viewpoint. Clemens also explained his knowledge of engine manufacturer attitudes. Considerable discussion indicated wide disagreement concerning solutions. It was also noted that the council had received directly opposing opinions from modeler and industry inputs. The council consensus was that, while the problem was of major concern, no agreeable solution had yet been presented. It was noted that to blanketly require mufflers without any specific and

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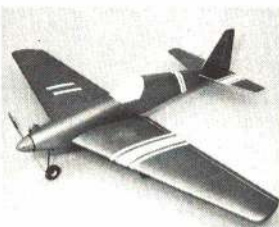
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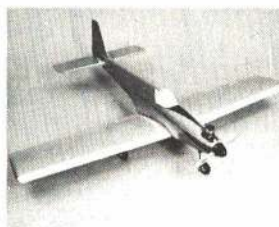
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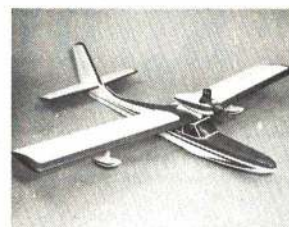
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acceptable standards being available would
not solve the problem.

Yet it was acknowledged that maximum
encouragement should be given to muffler use
in areas where noise problems exist; in such
areas the failure to use mufflers, even though
none might be considered satisfactory, would
be detrimental—use of mufflers, however in-
adequate, is considered a basic means of pro-
viding visible evidence that modelers are re-
sponsible citizens trying to do their best, de-
spite poor hardware, to operate as concerned
neighbors.

Encouragement of tuned pipe develop-
ment was also noted as a potential help in
that it promises to provide a natural incentive
for muffled operation through silencing with-
out power loss. Whether through this or other
means, it was noted that natural incentives
were preferred over arbitrary requirements,
and that the current state of muffler art was
not sufficiently advanced to justify manda-
tory requirement for all AMA activities.

FAI Programs

A review of past problems associated with
controversies in team selection programs indi-
cated that the basic reason involved a lack of
information and poor communication. Worth
noted, and it was verified by Clemens, that
FAI program policies and procedures had
evolved over many years with no single source
documentation available to the membership.
Misinformation and misinterpretation pre-
vailed, and the president has had to take per-
sonal action many times to decide contro-
versial issues.

As a result Clemens had earlier instructed
the executive director to compile a single all-

inclusive document for membership publica-
tion, concerning all aspects of AMA's FAI
activities. Worth reported that the compila-
tion job was now done and that the document
would be published in the forthcoming AMA
Membership Manual and also in the member-
ship magazine by mid-year.

Clemens also reported on his study of
AMA's FAI representation at international
meetings, including his observation of the
U.S. delegation in action at the FAI meetings
last December. He acknowledged that such
representation involved many very complex
situations, compounded by widespread mem-
bership differences of opinion concerning
what our position should be on any give
matter.

He noted, however, that a new structure
and procedure to decide AMA positions on
FAI matters was being examined and that this
should provide an improved means of repre-
senting membership interests overseas. He also
praised those who had served as FAI represen-
tatives despite problems of dealing with
special interests at home and personality diffi-
culties abroad. Clemens said he was en-
couraged by majority support at the recent
FAI meetings for our representation and our
ideas.

Contest Director Grading

It was noted that the subject had been
both discussed and unresolved for many
years, due to widespread differences over
specifics of various proposals. Council mem-
bers indicated that the goal of grading and
rewarding different levels of Contest Director
qualification was desirable but that no pro-

(continued on page 86)




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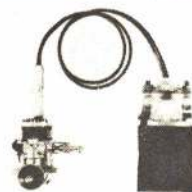
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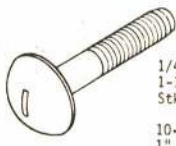
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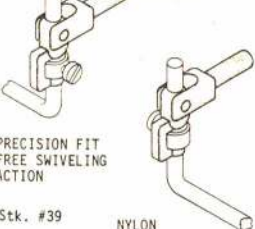


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AMA Council Meeting

(continued from page 83)

posals yet offered had sufficient acceptance.

Frank reviewed his own version of a proposal but received the same disagreement of opinions. Meanwhile it was generally acknowledged that the existing system of appointing Contest Directors seemed to be operating without major problems, despite reservations by several council members, so it was agreed that the present system would be continued. It was also indicated that contrary to the worries concerning new CD's, most problems involved long-established officials who were involved in controversial decisions.

This in itself indicated a need for better qualification of officials, but no action was taken due to lack of agreement concerning any previously submitted proposals.

Contest Director Handbook

May 1st was established as the deadline for final inputs to this project from council members. Contributions were acknowledged in recent weeks from Signorino, Boss, Frank, and Chisolm. Additional material was indicated to be coming from Chisolm, Patton, and Perdue. This project is to produce a booklet to supplement the AMA rule book—in effect a CD guide for contest matters not covered in the rule book; object to improve standards of CD performance and to make the CD's job easier by providing him with the accumulated know-how of experts in various contest matters.

License Number Policy

The council was asked whether the numbers reserved for AMA Presidents (1 through 100) could be transferred or passed on to others, such as from father to son. AMA HQ had also received a request to sell number 100 for \$200. After discussion, which included comments by the president and two former presidents, the council unanimously approved a motion by Piper (seconded by Morgan) to keep the numbers exclusively reserved for presidents only.

Junior Age Classes

A proposal, previously submitted by Wynn Paul of Lexington, Kentucky, was reviewed. This recommended establishment of further breakdowns in competition categories in a manner similar to current practice in swimming and other sporting events. Council discussion indicated agreement in principle but noted difficulties in implementing very soon. Further consideration was recommended, particularly concerning administration problems and procedures, before a decision would be made.

Distinguished Service Awards

The name of K.L. Irvis was proposed by Worth in recognition of his outstanding services, on behalf of the 1971 RC World Championships, in helping to obtain state aid which reduced AMA's cost substantially. It was also noted that, if accepted, this would be the first time any AMA member had received two Distinguished Service Awards, Irvis having previously won one for special flying site efforts.

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on behalf of the Pittsburgh ARCS club. On a motion by Witt (seconded by Frank) the proposal was accepted unanimously.

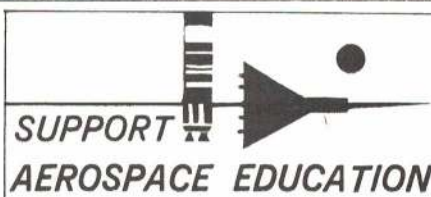
Worth then noted that a longtime AMA officer had recently retired following many years of service as a volunteer worker. The level of service rendered was deserving of an AMA Fellowship (lifetime membership) but it was noted that he was already a Fellow. It was then proposed that a Distinguished Service Award plaque be presented as a current indication of appreciation for services which continued beyond the time of the Fellowship award; approved unanimously.

Rule Book Rewrite

Boss noted that only the CL Contest Board had initiated action on this 1972 effort. Clemens then requested the executive director to ask the chairmen of the other Contest Boards for progress reports on the project, indicating deadlines for reply and final revision for the '73 rule book printing and mailing.

Contest Coordinator Procedures

Boss offered to produce a comprehensive set of guidelines for Contest Coordinators, including details of applicable Headquarters operations. The object is to provide a document to correlate all details of coordination procedure so as to provide a standard guide. The council approved the project. Boss requested input concerning procedures used by all coordinators and Headquarters, by April 1st.



Future Financial Considerations

Worth asked for council response to Potomac Aviation Publications' request for an increase in the magazine cost per copy. He noted that the publisher had agreed to a previous suggestion that the effective date of the increase be delayed from January until July, 1972. Piper moved (seconded by Morgan) that the increase be accepted, effective July 1; approved unanimously.

District Reports for Monthly Mailing

Clemens requested, as a means of improving communications between officers and clubs, that VP's provide regular district reports for publication in the Monthly Mailing, such reports to be from 1/2 to one page long.

Publication Proposal

The possibility of an expanded AMA magazine section was discussed, with the possibility of combining much of the material from the Competition Newsletter and the Monthly Mailing in a shorter lead time version of a larger magazine section. The council agreed that the possibility should be explored by means of a detailed proposal from the

executive director to be submitted to the council prior to the July meeting.

Noting that the council had been in session continually since early morning, with only a lunch break, and with all agenda items considered—plus some added ones—Clemens thanked all present and the meeting adjourned at 7 pm.

Witt and Worth then reviewed many such anticipated cost increases—for insurance, salaries, supplies, new computer services, expanded PR projects, etc. It was noted that even with a 5,000 increase in membership for 1972 AMA would have a loss operation, based on a budget estimate provided to council members. The reason for this was explained as due to the fact that the rate of expense rise had increased in the past year so as to exceed the rate of income produced from memberships. It was, therefore, recommended by the treasurer that a dues increase be put into effect for 1973.

The council agreed, noting that the amount of the increase and the benefits to be offered to the membership would be decided at the July council meeting. It was also noted that the guiding principle should be to not ask for more money to provide the same services but rather to offer more benefits to help offset the negative aspects of an increase.

It was recalled that this principle guided the last dues increase, in 1967, and that a member increase rather than a decline resulted. It was further pointed out that we had not imposed an increase for 1972 even though a financial review in 1971 had indicated the need—this deferral of one year should be publicized as a means of getting membership appreciation of a dues increase for '73.

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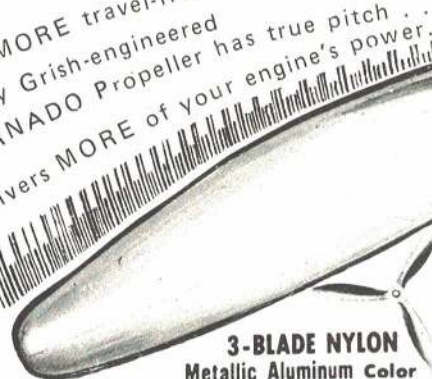
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36 3/8	36 1/4	36 3/8	36 1/4	36 3/8	36 1/4	36 3/8	36 1/4
37 3/8	37 1/4	37 3/8	37 1/4	37 3/8	37 1/4	37 3/8	37 1/4
38 3/8	38 1/4	38 3/8	38 1/4	38 3/8	38 1/4	38 3/8	38 1/4
39 3/8	39 1/4	39 3/8	39 1/4	39 3/8	39 1/4	39 3/8	39 1/4
40 3/8	40 1/4	40 3/8	40 1/4	40 3/8	40 1/4	40 3/8	40 1/4
41 3/8	41 1/4	41 3/8	41 1/4	41 3/8	41 1/4	41 3/8	41 1/4
42 3/8	42 1/4	42 3/8	42 1/4	42 3/8	42 1/4	42 3/8	42 1/4
43 3/8	43 1/4	43 3/8	43 1/4	43 3/8	43 1/4	43 3/8	43 1/4
44 3/8	44 1/4	44 3/8	44 1/4	44 3/8	44 1/4	44 3/8	44 1/4
45 3/8	45 1/4	45 3/8	45 1/4	45 3/8	45 1/4	45 3/8	45 1/4
46 3/8	46 1/4	46 3/8	46 1/4	46 3/8	46 1/4	46 3/8	46 1/4
47 3/8	47 1/4	47 3/8	47 1/4	47 3/8	47 1/4	47 3/8	47 1/4
48 3/8	48 1/4	48 3/8	48 1/4	48 3/8	48 1/4	48 3/8	48 1/4
49 3/8	49 1/4	49 3/8	49 1/4	49 3/8	49 1/4	49 3/8	49 1/4
50 3/8	50 1/4	50 3/8	50 1/4	50 3/8	50 1/4	50 3/8	50 1/4

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AMA Contest Calendar (continued from page 104)

MAY 14-E. GRANBY, CONN. (AA) Nor-East RC Air Races-'72. Site: E. Granby. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut Radio Control Club.

MAY 14-DAYTON, OHIO (A) Dayton 1400 Lap Rat Race & Reg. Goodyear. Site: Municipal Flying Field. W. Keller CD, 201 Ashwood Ave., Dayton, Ohio 45405. Sponsor: Dayton Buzzin' Buzzards.

MAY 14-HOUSTON, TEX. Manned Spacecraft Center RC Fun Fly. Site: NASA/ MSC. C. Scully CD, 5271 Memorial Dr., Houston, Tex. 77007. Sponsor: Manned Spacecraft Center RC Club.

MAY 14-CHICAGO, ILL. (B) Second Annual Inter-Club Contest. Site: Forest Preserve. D. Hardt CD, 7371 N. Lincoln, Chicago, Ill. 60646. Sponsor: Aero Angels.

MAY 14-DETROIT, MICH. 8th Annual Spring CL Races. Site: Rouge Park. J. Kilsdonk CD, 4412 McKinley, Dearborn Hgts., Mich. 48125.

MAY 14-MEMPHIS, TENN. (AA) Memphis Prop Busters CL Meet. Site: McKeller Park. T. Cimino CD, 981 June, Memphis, Tenn. 38177. Sponsor: Memphis Prop Busters.

MAY 20-TULLAHOMA, TENN. (A) Airfoil RC Glider Meet. Site: Airfoil Field. L. Webster CD, 1000 Sycamore, Manchester, Tenn. 37355.

MAY 20-21-LAFAYETTE, LA. (AA) 4th Annual RC Model Aviation Day. Site: Stutes Field. H. Richard CD, P.O. Box 52832, Lafayette, La. 70501. Sponsor: Acadian RC Club.

MAY 20-21-ABILENE, TEX. (AAA) Prop Twisters 4th Annual FF Championships. Site: Abilene. E. Thomas CD, 5349 Harwood, Abilene, Tex. 79605. Sponsor: Key City Prop Twisters.

MAY 20-21-HARVEY, ILL. (AA) Radio Control Club of Chicago 10th Annual RC Season Breaker. Site: Harvey. G. Fish CD, 17730 Cherrywood Ln., Homewood, Ill. 60430. Sponsor: Radio Control Club of Chicago.

MAY 20-21-HAMPTON, VA. (AA) 8th Annual Southeastern Va. RC Meet. Site: Hampton. D. Holmes CD, P.O. Box 814, Grafton, Va. 23490. Sponsor: Southeastern Va. RC Group.

MAY 20-21-MONROE, GA. (A) Atlanta RC Races. Site: Monroe Airport. G. Jacobson CD, 2205 Britten Terr., College Park, Ga. 30349. Sponsor: Atlanta RC Club, Inc.

MAY 21-TUCSON, ARIZ. (AA) Spring Invitational CL Contest. Site: Rodeo Park. T. Snow CD, 3408 N. 2nd Ave., Tucson, Ariz. 85719. Sponsor: Cholla Choppers M.A.C.

MAY 21-CLEVELAND, OHIO (AAA) & FAI WORLD RECORD TRIALS. 1st Annual Cleveland Aeromodel CL Speed Rally. Site: Cleveland Hopkins CL Model Flying Field. J. Smith CD, 960 Brenner Ave., N.W., Massillon, Ohio 44646.

MAY 21-BALTIMORE, MD. (AA) Flite Streaks 6th Annual CL Combat Contest. Site: Skyview Model Park. L. Lauer CD, 831 Lantern Rd., Baltimore, Md. 21220. Sponsor: Flite Streaks.

MAY 21-FRESNO, CALIF. (A) Fresno Monthly FF Meet (Cat. I). Site: Near Kerman. F. Ginder Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93726. Sponsor: Fresno Gas Model Club.

MAY 21-LAKEHURST, N.J. Old Timers FF by RC Eastern States Championships. Site: Lakehurst N.A.S. A. Thoms CD, 33 Cambridge Dr., Berkeley Hgts., N.J. 07922. Sponsor: Central Jersey RC Club.

MAY 21-WILMINGTON, DELA. (A) Delaware RC Club ECSS RC Soaring Contest. Site: Wilmington. T. Sterner CD, 903 Prospect Ave., Wilmington, Dela. 19809. Sponsor: Delaware RC Club.

MAY 21-COURTLAND, ALA. Decatur Fun-Fly. Site: Courtland Air Base. J. Ray CD, 1304 Fletcher Ave., SW, Decatur, Ala. 35601.

MAY 21-BLAINE, MINN. (AA) Minneapolis Model Aero Club Annual Spring FF Meet (Cat. II). Site: Hentges Sod Farm. L. Stockstad CD, 2648 Carlson Dr., Coon Rapids, Minn. 55433.

MAY 21-JAMESTOWN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Hartfield. W. Johnson CD, 153 Hallock St., Jamestown, N.Y. 14701.

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MAY 21—DOWNERS GROVE, ILL. (AA) Treetown Modelaires 6th Annual CL Meet. Site: Downers Grove South High School. J. Tulach CD, 2247 Bellevue Ave., Westchester, Ill. 60153. Sponsor: Treetown Modelaires.

MAY 21—COLUMBIA, MD. (A) DC/RC Rudder Only Meet. Site: Columbia. J. Stargel CD, 10625 Greenacres Dr., Silver Spring, Md. 20903. Sponsor: District of Columbia RC Club.

MAY 21—NEW CASTLE, PENNA. Penn Ohio RK Society 13th Annual Fun Fly. Site: New Castle Airport. W. Henderson CD, 202 Williams Rd., Butler, Penna. 16001. Sponsor: Pennsylvania Ohio RK Society.

MAY 21—AURORA, COLO. (A) MMM Monthly FF Meet (Cat. II). Site: E. Colfax Air Park. G. Batiuk, Jr. CD, 3066 S. Upham, Denver, Colo. 80229. Sponsor: Magnificent Mountain Men.

MAY 21—TULLAHOMA, TENN. (A) 8th Annual Old Timers FF Contest. Site: Tullahoma. C. Tuthill CD, 101 Westwood Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Air Foilers.

MAY 27-28—CLARKSDALE, MISS. (AAA) Clarksdale Climbers 12th Annual FF & RC Meet. Site: Fletcher Field. Mrs. G.C. Pickel CD, 1631 Steen, Clarksdale, Miss. 38614.

MAY 27-28—SCHENECTADY, N.Y. (AA) 3rd Annual Empire State RC Championships. Site: Schenectady County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

MAY 27-28—EUGENE, ORE. (AAA) Northwest Regional CL Championships. Site: Eugene Airport. M. Gilbert CD, 170 Formac, Eugene, Ore. 97402. Sponsor: Eugene Prop Spinners.

MAY 27-28—SHAWNEE MISSION, KANS. (AA) Shawnee Mission RC 2nd Annual Meet. Site: Shawnee Mission Park. C. Perkins, Jr. CD, 5009 W. 67th St., Prairie Village, Kans. 66208. Sponsor: Shawnee Mission RC Club.

MAY 27-28—KINGSVILLE, TEX. (AAA) 3rd Annual South Texas Navy Regional CL & RC Championships. Site: Kingsville N.A.S. J. Daubenspeck CD, Box 281, Bishop, Tex. 78343.

MAY 27-28—MONROE, N.C. (AA) MC/CC RC Air Races II. Site: Monroe RC Club. V. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe RC Club.

MAY 27-29—TAFT, CALIF. (AAA) United States FF Championships (Cat. I). Site: Taft. A. Vela CD, 11807 Crystal, Chino, Calif. 91716.

MAY 28—FT. WORTH, TEX. (A) Pylon-Formula I RC Meet. Site: Thunderbird Field. G. Ware CD, 609 S. Lake St., Ft. Worth, Tex. Sponsor: Fort Worth Thunderbirds.

MAY 28—OKLAHOMA CITY, OKLA. (AA) Central Oklahoma CL Championships. Site: 5300 N. Broadway Ext. R. Cloud CD, 4716 Judy Dr., Del City, Okla. 73115. Sponsor: Oklahoma City Controliners.

MAY 28—CINCINNATI, OHIO (AA) Queen City U-Control Meet. Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control.

MAY 28—RICHMOND, VA. (AA) Brain-busters Spring FF Meet (Cat. II). Site: Curles

Neck. R. Champine CD, 47 Lakeshore Dr., Apt. 1-C, Hampton, Va. 23361. Sponsor: B rainbusters Model Club.

MAY 28—CHARDON, OHIO (AA) C.R.C. 10th Annual RC Pattern Event. Site: Chardon. F. Vidmar CD, 26500 Zeman Ave., Euclid, Ohio 44132. Sponsor: Cleveland Radio Controlaires, Inc.

MAY 28—DOWNERS GROVE, ILL. (AAA) 2nd Annual CL "Memorial Day Classic". Site: W.A.M. Field. R. Vojislav CD, 7819 Chestnut Ave., Woodridge, Ill. 60515. Sponsor: Woodland Aero Modelers.

MAY 29—UNION, N.J. (AA) 18th Union CL Model Airplane Invitational. Site: Morrison Field. F. DeCicco CD, 53 Broadview Ave., Maplewood, N.J. 07040.

JUNE 3-4—NASHVILLE, TENN. (AAA) 9th Annual Mid-South RC Championships. Site: Percy Warner Park. B. Reuther CD, 6602 Highway 100, Nashville, Tenn. 37205. Sponsor: Middle Tennessee RC Society.

JUNE 3-4—BATON ROUGE, LA. (AA) "Cajun RC Classic" Baton Rouge 11th Annual RC Meet. Site: Kleinpeter Field on Pecue Lane. H. Roberts CD, 9243 Hampton Way, Baton Rouge, La. 70814.

JUNE 3-4—ROCHESTER, N.Y. (AA) 13th Annual N.Y. State RC Championships. Site: Rochester. R. Walder CD, 129 Westmoreland Dr., Rochester, N.Y. 14620. Sponsor: RC Club of Rochester.

JUNE 3-4—MANKATO, MINN. (AAA) 1st Annual Mid-West CL Championships. Site: Madison East Shopping Center. D. Nirk CD, P. O. Box 165, Mankato, Minn. 56001. Sponsor: Mankato Modelers.

JUNE 3-4—LINCOLN, NEBR. (AA) Lincoln Sky Knights 13th Annual RC Contest. Site: Arrow Airport. D. Svoboda CD, 2461 Sewell, Lincoln, Nebr. 68502. Sponsor: Lincoln Sky Knights RC Club.

JUNE 3-4—ST. LOUIS, MO. (AAA) Gateway FF, CL & RC Championships. Site: Buder Park. R. Underwood CD, 4109 Concord Oaks Dr., St. Louis, Mo. 63128. Sponsor: Greater St. Louis Modeling Assn.

JUNE 4—HADLEY, MASS. (AA) Hampshire Showdown RC Air Races. Site: Hadley. B. Sparrow CD, 418 Meadow St., Agawam, Mass. 01001. Sponsor: Hampshire County Radio Controllers.

JUNE 4—MESQUITE, TEX. (A) Dallas RC Club Pylon RC Warm-Up. Site: Samuels East Park. D. Brown CD, 930 Vinecrest Ln., Richardson, Tex. 75080. Sponsor: Dallas RC Club.

JUNE 4—BRISTOL, CONN. (AA) Hornets Model CL Classic. Site: Edgewood School. J. Scott, Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets Model Airplane Club.

JUNE 4—MUNCIE, IND. (A) 1st Annual Munsee Skychiefs Fun-Fly. Site: Prairie Creek Reservoir. J. McDonald CD, Box 384, Daleville, Ind. 47334. Sponsor: Munsee Skychiefs RC Club of Muncie.

JUNE 4—MILWAUKEE, WISC. (AA) Circle Masters CL Meet. Site: Dretzka Park. R. Brotz CD, 1800 S. Cardinal Ln., New Berlin, Wisc. 53151. Sponsor: The Circle Masters.

JUNE 4—WAUSAU, WISC. 5th Annual Fun-Fly. Site: Club Field. K. Sparr CD, P.O. Box 441, Wausau, Wisc. 54401. Sponsor:

Wausau RC Sportsmen, Inc.

JUNE 4—DAYTON, OHIO (AA) Spring CL Fly-In. Site: Dayton. J. Haupt CD, 3908 Necco Ave., Dayton, Ohio 45406. Sponsor: Dayton Buzzin' Buzzards.

JUNE 4—QUEENS, N.Y. (AA) Forest Park 4th Annual CL Contest. Site: Flushing meadow Park. R. Moore CD, 128 N. Elm St., N. Massapequa, N.Y. 11758.

JUNE 10-11—KANSAS CITY, MO. (AA) KC/RC Annual RC Meet. Site: Lake Jacomo Park. K. Borgman CD, 9700 E. 82nd, Rayton, Mo. 64138. Sponsor: Kansas City Radio Control Assn.

JUNE 10-11—SAN JOSE, CALIF. (AA) Wavemasters Annual RC Contest. Site: Wavemasters Field. K. Wilson CD, 728 Bolivar Dr., San Jose, Calif. 95123. Sponsor: San Jose Wavemasters RC, Inc.

JUNE 10-11—PENSACOLA, FLA. (AAA) Fiesta of Five Flags S.E. FF Model Airplane Championships (Cat. II). Site: Pensacola. T. McLaughlan CD, 4140 Fern Ct., Pensacola, Fla. 32503.

JUNE 10-11—CHESAPEAKE, VA. (AA) TRC 6th Annual AA RC Meet. Site: Fortress Air Field. M. Woolard CD, 301 Haledon Rd., Chesapeake, Va. 23320. Sponsor: Tidewater RC Club, Inc.

JUNE 10-11—ELKGROVE VILLAGE, ILL. (A) Chicagoland RC Modelers RC Meet. Site: Route 53 & 72. D. Wehrheim CD, 1841 W. Fletcher St., Chicago, Ill. 60657. Sponsor: Chicagoland RC Modelers, Inc.

JUNE 10-11—MARIETTA, GA. (AA) Annual CCRC Meet. Site: Club Field. J. Harper CD, 900 Piedmont Cir., Marietta, Ga. 30060. Sponsor: Cobb County RC Modelers.

JUNE 10-11—HOUSTON, TEX. (AA) Houston RC Club Annual AA Meet. Site: Houston RC Club Field. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Houston Radio Control Club.

JUNE 11—SHOREVIEW, MINN. (B) Minnesota State RC Stunt Championships. Site: St. Paul RC Club Field. D. Granlund CD, 7213 Oliver Ave., N., Brooklyn Center, Minn. 55430. Sponsor: St. Paul RC Club.

JUNE 11—W. SUFFIELD, CONN. (A) Nor'East RC Air Races '72. Site: NCRCC Field. H. Wainauski CD, 38 Alder Rd., Simsbury, Conn. 06070. Sponsor: Northern Connecticut RC Club.

JUNE 11—CLEVELAND, OHIO (AAA) 6th Annual CL Aeromodel Sport Race. Site: Cleveland Hopkins CL Model Flying Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116. Sponsor: Skylarks.

JUNE 11—DAVENPORT, IOWA (A) 15th Annual CI Model Airplane Contest. Site: Davenport Airport. T. Magers CD, 1403 E. 33rd St., Davenport, Iowa. Sponsor: Davenport M.A.C.

JUNE 11—SACRAMENTO, CALIF. (AA) Northern Calif. FF Council FF Meet (Cat. I). Site: Waegell Field. W. Vanderbeek CD, 630 Ashtan Ave., Palo Alto, Calif. 94306. Sponsor: 900 Club.

JUNE 11—N. LITTLE ROCK, ARK. (A) MARCS 3rd Annual RC Contest. Site: MARCS Field. F. Osborne CD, 18 Mohave, N. Little Rock, Ark. 72116. Sponsor: Mid Arkansas RC Society.

JUNE 11—WESTMINSTER, MD. (A) Westminster CL Meet. Site: Carroll County

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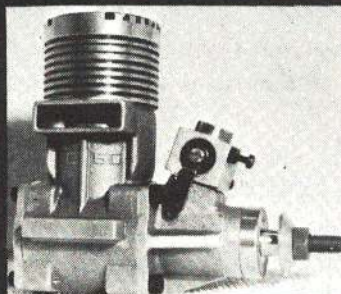
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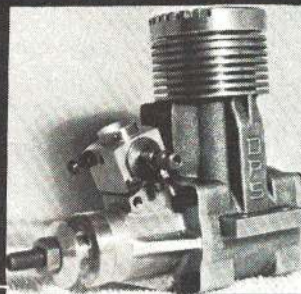
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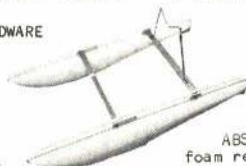
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JUNE 11—LINCOLN PARK, N.J. (A) East Coast CL Scale Championships. Site: Lincoln Park. E. Dickson CD, 36 Vreeland Ave., Clifton, N.J. 07011.

JUNE 11—CHICAGO, ILL. (AA) Aero Angels Annual CL Meet. Site: Forest Preserve. D. Hardt CD, 7371 N. Lincoln, Chicago, Ill. 60646. Sponsor: Aero Angels.

JUNE 11—VALKARIA, FLA. (A) Florida Miniature Pylon RC Races. Site: Valkaria. W. Schoonard CD, 2080 Sharon Dr., Winter Park, Fla. 32789. Sponsor: R.C.A.C.F.

JUNE 11—LAKEHURST, N.J. R/V RC 5th Annual Novice Meet. Site: Lakehurst. A. Schroeder CD, 18 Spencer Rd., Glen Ridge, N.J. 07028. Sponsor: Rockaway Valley RC Club.

JUNE 16-18—SPOKANE, WASH. (AAA) Spokane FF, CL & RC Internats. Site: Spokane Int'l Airport. Lt. Col. R. Hepker CD, Spokane Int'l Airport, Spokane, Wash. 99219.

JUNE 17-18—DENVER, COLO. (AA) 14th Annual Mile-Hi RC Contest. Site: Lowry A.F.B. H. Geller CD, 6920 E. Exposition, Denver, Colo. 80222. Sponsor: Mile-Hi RC Club.

JUNE 17-18—DES MOINES, IOWA (A) Des Moines Modelaires Annual RC Contest. Site: Modelaires Field. K. McClure CD, 5703 Terrace Dr., Des Moines, Iowa 50312. Sponsor: Des Moines Modelaires, Inc.

JUNE 17-18—SPRING VALLEY, ILL. (A) Illinois Valley RC Meet. Site: Spring Valley Airport. A. Annis CD, 2103 Madison St., Streator, Ill. 61364. Sponsor: Illinois Valley RC Club.

JUNE 17-18—DAYTON, OHIO (AA) Wright Brothers Memorial Annual RC Meet. Site: Wright Patterson A.F.B. D. Lowe CD, 3491 Clar-Von Dr., Dayton, Ohio. Sponsor: Western Ohio RK Society.

JUNE 17-18—FT. WORTH, TEX. National RC Fun Fly Championships. Site: Thunderbird Field. B. Lutker CD, 5333 Wooten Dr., Ft. Worth, Tex. 76133. Sponsor: Fort Worth Thunderbirds.

JUNE 18—MUSCATINE, IOWA (AA) 3rd Annual CL Meet. Site: Muscatine Plaza. F. Brewer CD, 706 Walnut, Muscatine, Iowa 52761.

JUNE 18—URBANA, ILL. (AA) C-U Aeronauts 10th Annual CL Meet. Site: Illini Airport. J. Fasimpaur CD, 310 E. Benham St., Tolono, Ill. 61880. Sponsor: Champaign-Urbana Aeronauts.

JUNE 18—SALEM, N.H. (AA) Salem CL Model Airplane Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876.

JUNE 18—AURORA, COLO. (A) MMM Monthly FF Meet (Cat. II). Site: E. Colfax Air Park D. McGhee CD, 1260 Elm, Denver, Colo. 80220. Sponsor: Magnificent Mountain Men.

JUNE 18—OHIO CITY, OHIO (A) Club RC Contest. Site: Club Field. D. Kraner CD, RR No. 1, Ohio City, Ohio 45874. Sponsor: SHOO Flyers M.A.C., Inc.

JUNE 18—MEMPHIS, TENN (AA) Memphis Prop Busters CL Meet. Site: McKeller Park. T. Cimino CD, 981 Jume, Memphis, Tenn. 38177. Sponsor: Memphis Prop Busters.

JUNE 18—DETROIT, MICH. (AA) Cloud-busters Inc. 10th Annual CL Meet. Site: Rouge Park. C. Wentzel CD, 30612 Dover, Warren, Mich. 48093.

JUNE 24-25—DAHLGREN, VA. (AA) Annual RC Tournament. Site: Naval Weapons Lab. J. Spalding CD, 5803 Ellerbie St., Lanham, Md. 22801. Sponsor: DC/RC Club.

JUNE 24-25—KENT, WASH. (AAA) Boeing Management Assoc. Model Aeronautics Scholarship FF (Cat. II), CL, RC & Ind. (Cat. I) Meet. Site: Boeing Space Center. B. Nelson CD, 22919 105th Ave., SE, Kent, Wash. 98031. Sponsor: Kent Strat-O-Bats M.A.C.

JUNE 24-25—HUNTSVILLE, ALA. (AA) MACH FF Contest. Site: Old Huntsville Airport. M. Penny CD, 2105 Rosewood Cir., N.W., Huntsville, Ala. 35810. Sponsor: Model Airplane Club of Huntsville.

JUNE 24-25—PENSACOLA, FLA. Northwest Florida RC Modelers Fun-Fly. Site: N.A.S. Elliyson Field. W. Fritts CD, 206 Hermy Ave., Pensacola, Fla. 32507. Sponsor: Northwest Florida RC Modelers.



from left to Right... RAY GALLO,
HOWARD (GOLDIE) GOLDHANK
ALVIN SEGAL

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JUNE 25—COUNCIL BLUFFS, IOWA (AAA) 9th Annual Midwestern Model CL Contest. Site: Iowa School for the Deaf. D. Hutcheson CD, 317 Spencer Ave., Council Bluffs, Iowa 51501. Sponsor: Council Bluffs Balsa Busters.

JUNE 25—ROCKFORD, ILL. (AAA) Rockford Aeromodelers Triple A CL Meet. Site: Riverdahl Field. J. Tappaner, Sr. CD, 508 Pearl St., Rockford, Ill. 61108. Sponsor: Rockford Aeromodelers.

JUNE 25—EDWARDSVILLE, ILL. (A) First Annual RC Fun Fly Contest. Site: Edwardsville. A. Gonzalez CD, 80 Shirlwin Dr., Granite City, Ill. 62040. Sponsor: East Side RC Club.

JUNE 25—FRESNO, CALIF. (A) Fresno Monthly FF Meet (Cat. I). Site: Near Kerman. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

JUNE 25—HADLEY, MASS. (AA) Hampshire County Radio Controllers RC Meet. Site: Hadley R. Barkowski CD, 32 Lyman St., Easthampton, Mass. 01027. Sponsor: Hampshire County Radio Controllers.

JUNE 25—APPLETON, WISC. (A) Valley Aero Annual RC Meet. Site: Club Field. J. Schmieding CD, 2118 N. Division St., Appleton, Wisc. 54911. Sponsor: Valley Aero Modelers.

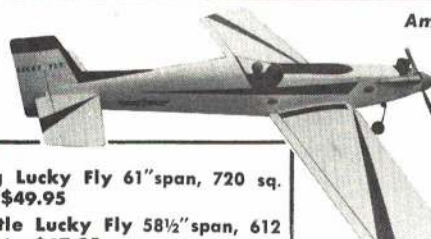
JUNE 25—YOUNGSTOWN, OHIO (A) 3rd Annual CL Combat Smasher. Site: Austintown Township Park. J. Peters CD, 315 Bradford Dr., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

JUNE 25—MILLERSPORT, N.Y. (AA) United RC Pylon Racing Circuit Meet. Site: Millersport. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225.

JUNE 25—COOK COUNTY, ILL. (AA) Skylarks 5th Annual A & B w/Standoff Scale Meet. Site: Ned Brown Forrest Reserve. R. Swindell CD, 842 C Colonial Dr., Wheeling, Ill. 60090. Sponsor: Skylarks RC of Illinois.



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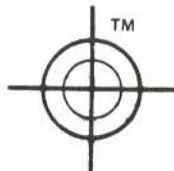
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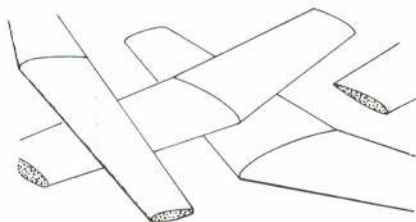
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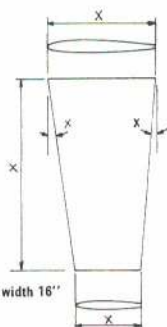


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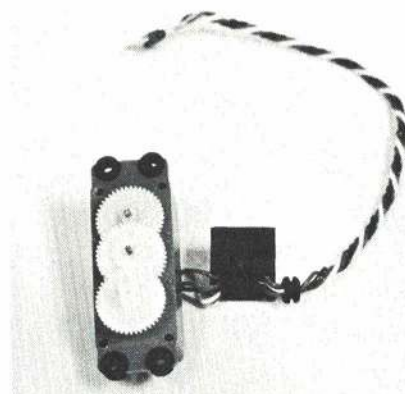
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Blue Ribbon Review

(continued from page 14)

The system was installed in the J-CRAFT Trainer with a Webra 40 engine. The plane was built as a club trainer, to be used under the supervision of a qualified instructor pilot. The system performed well in the trainer tests, exhibiting adequate range capability and good control response. It was determined that the J & J is an excellent intermediate trainer, ideally suited to supervised pilot training. It is reasonably docile at intermediate power settings and can perform most of the AMA pattern maneuvers at high power settings.

G45 Specifications: All components are housed in high impact plastic cases which measure as follows: Transmitter, 7-1/8 x 6-7/16 x 2-1/8", Receiver, 2-1/8 x 1-9/16 x 11/16", Servo, 2-1/4 x 1-11/16 x 7/8", Battery Pack, 2-1/8 x 1-1/4 x 1-1/4". The transmitter and receiver batteries are made up of 500 mah cells with 9.6 volts in the transmitter and 4.8 volts, center tapped, for the receiver. Power consumption of the transmitter is about .88 watts at 92 ma and the receiver, at idle, draws .24 watts at 50 ma. The receiver output pulse is 1.8 ms \pm 1.1 ms wide with a rise time of more than 0.5 ms. Pulse repetition rate is 60 per second (measured on a Hewlett Packard 120B oscilloscope). Figure is a plot of steady state system response through one complete cycle of the elevator control. Maximum hysteresis error is about 3° of servo position for a given stick position approached from



Servo amp is an encapsulated IC with discrete components. After checkout at the factory, it is solidly potted.

opposite directions. There is a pronounced flat spot in the center of about 40° of stick travel. This shows up as a "dead band" or notch about stick neutral of \pm 2.0 degrees. The system was tested at + 40°F and 110°F. Operation was satisfactory at the lower temperature except for one sluggish servo. At all times the performance was consistent and dependable. An example of this system's good performance is that Dave Grey, designer of the DuBro helicopter, uses the G45 exclusively and likes it. That's a rather demanding application although on short operating ranges.

Overall Radio System Evaluation: The G45 Space Commander is reasonably priced and conservatively designed. It is recommended as a good radio, particularly for the economy-minded.



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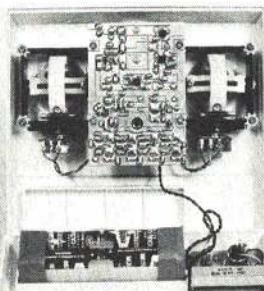
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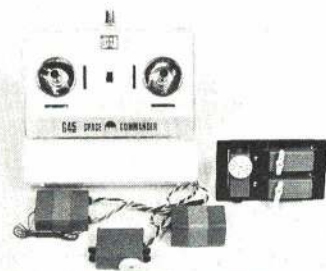
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Very compact transmitter PC board is neatly assembled. Note how the stick components slide into place. They are quite smooth but not adjustable. Trim functions give 30 percent of servo travel movement.



System comes quite complete, the usual four servos charging system, all nicad batteries. Of special note are the two servo trays supplied. Other tray for three abreast mounting.

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Denight Special

(continued from page 71)

and you are sure of the setting, you simply open the needle enough so that the mixture is rich. The excessive fuel flow is more than enough to keep it cool. You simply return the needle to its original setting when ready to go.

The ideal power package should provide a means of feeding the engine all the fuel it can use and clean, unpolluted air to go with it. Both come with the Denight package. The engine people supposedly have given us more power by means of a rear carburetor intake. Unfortunately this intake falls behind the exhaust, which emits carbon monoxide—a poison to most anything, including our engine. The solution on the Denight is the air intake passage through the cheek cowl. The air is taken in well in front of the exhaust and piped directly into the carburetor. Proof of the pudding is that the original Denight has a short cut intake which opened to outside air—potentially, exhaust fumes could get in on the ground. The engine was also difficult to adjust. Changing to the original specs and the forward intake proved to be the solution. Short

cuts always leave you short-changed.

Walt Good ran some tests to prove the G loads our models encounter. His work was done years ago, using slow stunt models. He found that even those clunkers could build up 40 Gs in violent maneuvers. Wonder what a Formula 1 exerts on our fuel supply at over 150 mph in a pylon turn? Obviously, there are times in racing when our engines are starved for fuel and we would do well to even things out. Also, it would be nice to know that *however* we set or peak the engine on the ground, it would run exactly that way in the air, every time. With all our genius, one day someone will produce a fuel injection system which will compensate for all conditions and do exactly what we want. In the meantime, pressure fuel feed is the best method in use today. The system makes use of the pressure which is available in the engine's crankcase to build up a considerable amount of pressure in the fuel tank.

The system which I developed has become known as the Positive Pressure System and operates through the use of the engine's intake valving. In effect, as the piston comes down there is a time in the cycle when pressure is built up in the crankcase. It also tends to produce a



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vacuum during the upward portion of the cycle. My arrangement uses the rotary valve to time the crankcase pressure outlet so that it is only open during the downward, or positive pressure, portion of the cycle. The greatest amount of pressure possible is tapped with no possibility of pressure pulsing.

The tank pressure will vary proportionally to the rpm of the engine. The greater the engine speed, the greater the pressure. With more pressure in the tank, more fuel is forced to the engine—exactly what it wants as it goes faster. Pretty hard to fight an arrangement like that!

All the pressure in the world will do no good unless the fuel can get out of the tank into the engine with the model in any conceivable attitude. Thus, the choice of fuel tanks is equally important. I prefer a metal tank which has an internal weighted swivel, located in the rear of the tank, and responds to exactly the same forces the fuel is subjected to. This swivel is the fuel outlet to the engine, assuring that the outlet will always be where the fuel is. The tank has two new items: one is a pressure inlet tube which runs to a small dome on the top outside of the tank, the purpose of which is to let pressure

into the tank, at the same time making it difficult for fuel to get back into the engine through the pressure line. The second abnormal item on the tank always raises questions too. I have a difficult time convincing people that it is my gas cap! Obviously, to fill a tank you need to vent it or else... The simple solution appeared to be an out-sized filler tube; a small tube inserted into it leaves ample room for the tank to breathe and thus vent. The out-sized tube must be sealed for the pressure to work, so provide it with a cap—a piece of a bolt which threads into the filler tube and, when tightened, makes a positive seal. The tank is also shock-mounted. It will not shake apart mounted this way, and the fuel will not tend to foam quite so easily. I fastened some brackets to the tank so I could mount it by the use of rubber grommets. If it's good enough for the servos electrics, it should be good enough for my fuel tank. Just between us pylon pushers, I have been very happy with the Denight's operation, so have Ed Keck and Hale Wallace. Ben Howard always labeled his airplanes DGA...this may not be a Howard design, but it still deserves his label of a "Darn Good Airplane."

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MODEL AVIATION

Official magazine

A.M.A. NEWS



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AMA Actions Appreciated by FAA

A visit by AMA officers to the Federal Aviation Administration (FAA) last February reveals that AMA actions in the past year, in response to distorted news media publicity concerning models flying in the vicinity of full scale aircraft, have apparently helped avoid the likelihood of government intervention in the near future. In the meantime our activities are being scrutinized, especially from the point of view of whether our attempts to improve safety by self-regulation of model flying activities are effective.

The picture is brighter than it might seem. If "incidents" between models and full scale aircraft can be avoided, the danger of federal regulations can be avoided indefinitely. The FAA is looking for solid evidence—something more than talk about safety—that our activities will naturally result in safe operation of all types of model flying which are not restrained to the ground.

A factor acknowledged by FAA as favoring non-government regulation has been good communications and cooperation between AMA and FAA. AMA's prompt and widespread reporting of the safety problem in recent months has been cited as evidence of responsible action. The FAA has also noted favorably that AMA influence extends beyond its membership, as evidenced by publication in all model magazines of AMA's October report of the New York "incident" (see February AAM, page 53).

More Plus Factors

Just previous to the FAA meeting the AMA Executive Council had met in Washington and approved the Official AMA Safety Code (see adjoining column). The code had been proposed last year, but the approved document contains modifications suggested earlier by discussions with FAA personnel. The appointment of a new Safety Committee chairman who is both a commercial pilot and a modeler (Earl Witt, AMA's Secretary-Treasurer) showed that we are concerned with how our operations interact with others. Also helpful in this respect was a special message on the cover of the 1972 rule book which relates to safety problems between models and full scale aircraft.

Local AMA-FAA Contact

So far the AMA-FAA discussions have been on the national headquarters level—but good communication between local FAA officials and model club officers would be very useful. A good knowledge of local model

Official AMA Safety Code

A. ALL CATEGORIES

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested.
2. I will not fly my model higher than approximately 400 feet within 5 miles of an airport, without permission of the airport operator. I will give right of way to, and avoid flying in the proximity of, full scale aircraft. Where necessary an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full scale aircraft.
3. Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless, and/or dangerous manner.

B. FREE FLIGHT

1. I will not launch my model aircraft unless at least 100 feet downwind of spectators and automobile parking.
2. I will not fly my model unless the launch area is clear of all persons except my mechanic and officials.
3. I will employ the use of an adequate device in flight to extinguish any fuses on the model after it has completed its function.

C. CONTROL LINE

1. I will subject my complete control line system (including safety thong, where applicable) to an inspection and pull test prior to flying.
2. I will assure that my flying area is safely clear of all utility wires on poles.
3. I will assure that my flying area is safely clear of all non-essential participants and spectators before permitting my engine to be started.

D. RADIO CONTROL

1. I will have completed a successful radio equipment ground range check before the first flight of a new or repaired model.
2. I will not fly my model aircraft in the presence of spectators until I become a qualified flyer, unless assisted by an experienced helper.
3. I will perform my initial turn after takeoff away from the pit, spectator, and parking areas, and I will not thereafter perform maneuvers, flights of any sort, or landing approaches over a pit, spectator, or parking area.

flying activities is needed by FAA people if modelers are to avoid uninformed local FAA action. The message is that AMA club officers should get to know the local FAA officials; invite them to attend and participate in club

meetings, Sunday flying, and contests. AMA HQ experience is that the FAA representatives are friendly, interested and cooperative. They acknowledge the need for our help, and they appreciate all the evidence we can pro-

vide to show that we are engaged in a responsible activity guided by mature leaders. AMA HQ is documenting this, but there remains the need to amplify the written documentation with local person-to-person acquaintanceship.

It's likely that there will be some contacts with modeling initiated by FAA officials, especially with regard to contests. The FAA has AMA's contest calendar, and one or more observers may attend meets without announcement, simply to get a current look at what we're doing. Obviously this means that safety will be a primary concern. This may make AMA Contest Directors nervous, but it should also be good for making sure that we don't ignore obvious safety precautions in our operations.

Why FAA Is Involved

To the FAA our models are simply miniature aircraft being flown from the ground, subject to the same rules as full scale aircraft. How tightly they choose to apply these rules depends on us; the current philosophy is to not regulate any more than necessary to assure safe operations.

AMA's Role

The FAA recognizes AMA as the authoritative spokesman for model aviation. We're in

the direct communications pipeline, with personal visits and phone calls between AMA and FAA personnel. This is comparable to our status with the FCC, which means we're held in high regard. We have had outstanding success in working with the FCC, and the outlook is bright for our relationship with the FAA.

There will be much more on this subject which will be reported from time to time. For now, the message from FAA is clear: avoid incidents between models and full scale aircraft to avoid regulation. And much thought needs to be given to some basic thinking within FAA: that the flying of models over 400 feet altitude anywhere (not just near airports) without FAA knowledge is a safety problem. This poses a problem for some of our activities, particularly Free Flight, and we need to work out how to live with or modify that philosophy.

For now the AMA Safety Code should become a living guideline rather than mere words on a piece of paper. Next year this code, or something much like it, may become the basis for AMA insurance coverage. The reasoning is that it is not what you fly but HOW you fly that counts. The goal is AMA's new safety slogan: SAFE FLYING IS NO ACCIDENT!

TRANSPO 72 MAY 27-JUNE 4

Dulles Airport, about 30 miles west of Washington, D.C., has been the scene of frantic activity for many months. Bulldozers and cranes have been roaring constantly while buildings were being erected, roads created, parking lots paved, and grandstands installed. It's all part of preparations for the world's fair of transportation, including what is expected to be the most spectacular series of air shows ever held in this country.

Transportation is the theme, and all forms are included: cars, boats, trains, trucks, and planes. All will be demonstrated continuously during nine days of Transpo 72—the code name for the 1972 U.S. International Transportation Exposition, first ever held anywhere.

Although transportation in general is the theme, aviation is expected to dominate the action. While all kinds of exotic new ideas for trucks, trains, and other ground transportation will be featured, there will be daily air

shows to keep the skies alive with action. Included will be all the usual air show headliners: military jet teams such as the Blue Angels, Thunderbirds, Golden Knights and many non-military performers such as Bob Hoover, Art Scholl, the U.S. World Championships Aerobatic Team, full scale Formula 1 racers, parachutists, soarers, balloonists, the best of antiques and experimental aircraft.

Model aviation will also be featured in the greatest collection of air show acts ever put together. The whole spectrum of model aviation will be included: Scale, Pylon Racing, Helicopters, Aerobatics, Sailplanes, and such special acts as Snoopy and the Red Baron. Model rocketry will be part of the show as will a Control Line flying school for kids. Flyers and their models are being recruited from all over the country for this spectacular event which is expected to be an every other year affair.

Coordinating authority for all aeromodeling activities at Transpo is the Academy of Model Aeronautics. The AMA and all other divisions and affiliates of the National Aero-



NAA Transpo 72 emblem illustrated is the official identification for all NAA affiliates, including AMA, which will have members performing in the big show at Dulles Airport, near Washington, D.C. The red, white and blue emblems, self-stick decals, are available from AMA HQ. \$1 per set.

nautic Association will be jointly operating all non-military aspects of the air show. AMA will be working side by side with the Soaring Society of America, the U.S. Parachute Association, the Professional Race Pilots Association, the Aerobatic Club of America, the Experimental Aircraft Association, the National Association of Rocketry, and the Antique Airplane Association.

AMA members will be admitted at a discount if they obtain tickets in advance from AMA HQ. Admission tickets (per day) for adults are only \$2.00 instead of \$3.00; tickets for children under 12 only 50 cents instead of \$1.00. A special nine-day pass is available for \$10. Also, a self-stick Transpo emblem set (six emblems) is available for \$1.00. Send check or money order to AMA-Transpo, Suite 620, 806 Fifteenth St., N.W., Washington, D.C. 20006. Orders must arrive at AMA HQ no later than Wednesday, May 10.

Four huge exposition buildings will house special exhibits and static displays. The huge ramp area at Dulles will also be filled with all kinds of aircraft and other means of transportation. AMA and the other NAA organizations will have booths in one of the exposition buildings.

No problem of crowding at Dulles. The airport, property of the Federal Government, is so big that the entire exposition, including the air show operation which will be spread out along a mile of runway, can operate without interference to normal airline activity.

AMA clubs will play a big part in the action. Expected to participate will be members of the Northern Va. RC Club, The Prince Georges (Md.) RC Club, The S.L.O.W. Club, the D.C. Maxcutters, the DC/RC Club, the Delaware RC Club, and many other clubs around the country from which individual performers will be selected.

The emphasis will be on show business—entertainment first, with education through soft-sell. The basic effort will be to show what models can do, to show the variety and sophistication so as to help dispel the toy



A featured performer in the AMA air show of Transpo 72 will be Al Signorino flying "Snoopy's Doghouse" by RC. This amazing airplane never ceases to astonish the public, especially when teamed with the Red Baron.

PRESIDENT'S MEMO

MORE FUN FROM AIR MODELING. Even though air modeling is educational, recreational, and occupationally therapeutic, the primary reason for indulging is **JUST FOR FUN!** Those responsible for AMA's leadership are always searching for ways to make airplane modeling **MORE FUN.** The competition flyer is already pretty well taken care of, with the bulk of AMA's attention, through necessity, going toward the problems and actions of competition flying. For the remainder of the dues-paying membership, who I shall lump together under the title of "Sunday Flyers", I have some personal suggestions on ways and means of creating **MORE FUN** from the basic modeling you are already involved in.

MODELING IN ANY FORM IS FUN, but it is must more fun if it involves someone else—more fun sharing experiences, "speaking the language", profiting from the other guy's skills or disasters, and the fun of "belonging". In other words, for more fun, seek out other modelers and form clubs. I promise that you will learn modeling and improve your workmanship much faster if you have a group to learn from and share with.

There are side benefits, too, that you may never have considered. Among these: you can learn leadership (or even good "followship"), organizing, public speaking (maybe you never get to talk at home!), service to your companions and to your community, sportsmanship, getting along with others, learning to relax through hobbies, and a multitude of other blessings. And all of this comes at a mighty low price compared with most other forms of activity. **AND AIR MODELING IS COMPLETELY WHOLESOME AND PROGRESSIVE!**

FORMING CLUBS. First, find some more modelers, or "sell" others on modeling. Then find a place to get together. If you can start out with no better, then meet at each other's home. But **DON'T BE BASHFUL** about asking for the use of community meeting places. These include various civic and recreation centers—because your community has an obligation to **YOU** the same as it has toward other sport, hobby, and recreational interests. After all, how many people can use a tennis court at once?! Other available meeting places may be found in churches, schools, banks, and other industrial and utility facilities. **DON'T BE CHICKEN** about asking, because air modeling is a clean, progressive, and educational activity which creates happy, well adjusted followers, and provides a profoundly



AMA President John Clemens

favorable influence over the youth of the community.

AMA CHARTERED CLUBS. I highly recommend that you charter your club with AMA as soon as possible. The benefits are great! Write to AMA Headquarters for further information on chartering—a free charter "kit" is available for immediate mailing to you.

CLUB PROGRAMS. Probably the most important ingredient in keeping interest high is to "bait" your meetings with good programs. The list of possible programs is endless. I'll mention a bunch of subjects that are "tried and true". **"TRY 'EM. YOU'LL LIKE 'EM!"**

Try: technical programs; invite expert or well known modelers as speakers; invite manufacturers to offer programs or demonstrations; or ask them for printed information to pass out. There is almost always one in your group who is adept at research and development, so encourage his leadership. Have "show and tell" programs, with members bringing in models, finished or under construction, or even just plans for others to consider. Movies and slides of modeling or associated activities make excellent program material. AMA has a film library that is being constantly added to, so write for the latest AMA list. Many aircraft manufacturers and airlines have movies of general interest, and the Air Force and the Navy have movies, too. Many other clubs will swap movies and slides with your group.

Try: a "tall tales" night and swap your funniest modeling yarn or most interesting experience (I personally know a million!). Give a prize for the best story. Have programs

where prizes are given (no need to be big, as recognition is all we really need!) for the best models brought to the meeting, with perhaps a break between classes or ages. Or even a photo night, where everyone brings **ALL** the modeling photos he has, for others to enjoy. Have a "New Wrinkle" night where there is a little competition for the best new idea. Try an "old engine" or engine collection night.

AWARDS, as a club activity. Merit certificates are given by several of the outstanding clubs across the country, and these can cover a multitude of services or accomplishments. "Sympathy" awards (usually gags) can be awarded for outstanding bad luck. And don't forget to thank your club and civic leaders when they are deserving. Thanks like this "grease the skids" for the **NEXT** time. And an **OUTSTANDING IDEA** is a "Wives and Family Night", or even a "Wives Appreciation Night", where for your meeting you take all the wives of the group out for dinner. **TRY THIS!** It is magic.

More program ideas: room permitting, have a little flying competition with nickel or dime gliders, or 15 cent rubber-powered planes, or better still, the famous **AMA CUB** or **DELTA DART** rubber band model designs by our Technical Director, Frank Ehling. And you older guys watch out, or the kids will beat you!

TO EXPRESS PRIDE IN YOUR CLUB—get an insignia or emblem (AMA's chartered clubs have literally hundreds of them!). They can be either handsome, humorous, explanatory, or any combination of these. Get decals made of your insignia. Or, possibly, have cloth patches, shirts, jackets, or even jumpers made. Club pins and membership cards are other worthwhile projects. And a **NEWS-LETTER** is a **MUST!** This is because communication is the life-blood of fun modeling. Send the newsletter to your own members, other clubs, and, of course, to AMA Headquarters. Many of the clubs send their newsletters to me personally, and I **READ EVERY WORD!**

LASTLY—show off air modeling. Put on flying demonstrations. Form a demonstration "team" of your better modelers. Offer models for display in department stores, sports shows, airports, and other gathering places. The better **YOU** make modeling look, the more you can expect from your community. You have a wonderful product to sell, in air modeling, so do it proudly. And don't forget to sell memberships in the Academy of Model Aeronautics. It serves you! **JUST FOR FUN!**

John E. Clemens
AMA President

image, then to show the kind of people involved—from all walks of life—and finally, to tell how anyone interested can get involved.

Model aviation's greatest PR opportunity will come on May 26—preview day for Congress and the national news media. AMA is scheduled to produce an hour long "warmup" show just prior to the full scale performances. No other group will have so much time available. Our goal is to outdo the show that follows, to produce memories that will linger longer than the relatively "old hat" type of air show performances most people have seen before. Where else but in the world of aeromodeling, for example, can Snoopy and the

Red Baron actually come to life in air-to-air combat?

First conceived in the mid-60's the United States International Transportation Exposition was to be a purely aerospace fair. Later, planners decided that rather than being limited to aeronautics and space the format should be expanded to encompass the entire spectrum of transportation—air, space, ground and water—and how these various transportation requirements and the modes to satisfy them can be integrated.

Work is proceeding seven days a week at a 10 to 14-hour-a-day clip in an effort to make up for any delays caused by adverse weather

and by changes in concept and scope. The Honorable John A. Volpe, U.S. Secretary of Transportation, is personally involved in the project, and other departments and agencies of the government have pitched in to help. Officials express confidence that the show will meet its opening day target date.

Total attendance is expected to range between 925,000 to 1,300,000 visitors according to exposition officials, with some 250,000 people expected on each of the final weekend days (June 3 and 4). Among the visitors will be approximately 357,000 businessmen of whom 50,000 are expected to come from overseas.

AMA Executive Council Winter Meeting

Council members assembled on February 12, 1972, at 9 am in the office of the National Aeronautics Association, Washington, D. C. After some preliminary remarks by the AMA President, the meeting began at 9:20 am, with the following in attendance.

John E. Clemens, President, Dallas, Tex.; Earl F. Witt, Secretary-Treasurer, Chambersburg, Pa.; John Worth, Executive Director, Fairfax, Va.; Cliff Piper, District I Vice-President, Atkinson, N. H.; Bill Boss, District II VP, New Hyde Park, N.Y.; Josh Titus, District II Associate Vice-President, Paramus, N.J.; Ron Morgan, District III VP, Scotland, Pa.; John Patton, District IV VP, Frederick, Md.; Cliff Telford, District IV AVP, Bethesda, Md.; James Perdue, District V VP, Athens, Ala.; Al Signorino, District VI VP, Bridgeton, Mo.; Jack Josaitis, District VII VP, Dearborn, Mich.; Murry Frank, District VIII VP, Wichita Falls, Tex.; Jim Mowrey, District IX Acting VP, Kinsley, Kansas; Alex Chisolm, District X VP, Fresno, Calif.; R. Lopshire, AMA Public Relations, Cochranville, Pa.

Clemens initiated business by distributing copies of his memo, previously written for and circulated at the 1972 annual trade show of the Hobby Industry Association of America, concerning the need for improved industry public relations support in coordination with AMA efforts in the same area. He noted that much of AMA's progress in recent years was due to emphasis on public relations to the general public, to the industry, and to the AMA membership. Clemens also credited progress to an extremely close and effective working relationship between the AMA President and the Executive Director.

The meeting then proceeded to the previously published (January '72 AMA Monthly Mailing) agenda. Note: the subject listing does not coincide with the published agenda numbering—it follows the order of business as conducted:

1972 Nats

Earl Witt, chairman of the Nats Executive Committee, reported on results and recommendations resulting from the Nats Planning Conference which took place in Chicago on February 5. The committee chairman presented a packaged recommendation to retain the Nats event schedule essentially as in 1971, except that:

- a. Free Flight to be flown by Cat. II AMA rules (small field conditions).
- b. Free Flight Scale to be divided into separate Gas and Rubber Power events.
- c. Helicopter to be run as an unofficial event (sponsorship by National Free Flight Society anticipated). This action is consistent with the fact that Helicopter rules are provisional rather than official.
- d. Rat Race Jr. and Sr. event times extended from half to full days.
- e. Fee for families of AMA members to be only \$2 instead of \$4—special Nats-only license and mechanic's fee combined.
- f. Championship scoring system to be clarified (operation to be same as in '71 but explanation to be publicized).
- g. RC Pylon models to be processed before qualification flying.

Following discussion of the above listed details, the Nats Executive Committee recommendation was voted on and accepted unani-

mously. It was also noted that if the Navy has to cancel the 1972 Nats the Academy will drop this event from this year's schedule, due to lack of time to work out alternative arrangements.

Financial Review

Copies of AMA's 1971 financial statement (just compiled the week prior and complete except for minor details) were distributed to council members. Worth then discussed various aspects of the report, particularly emphasizing that, despite a record membership increase for the year, headquarters operating expenses exceeded income by about \$800.

It was noted, however, that about \$6,000 in contributions and interest from various AMA savings accounts had more than made up for this deficit. The interest also paid off a special \$2,100 expense item in connection with 1969 and 1970 film projects. The surplus after these deductions produced a net gain for the year of approximately \$3,200. It was further noted that these figures did not include a surplus remaining from the 1971 RC World Championships, which is intended to be used to complete a special PR film project in connection with the event.

Boss then moved (seconded by Chisolm) to accept the financial report; approved unanimously.

A second phase of the financial review relating to 1972 and future operations was deferred for later discussion (see agenda item titled Future Financial Considerations).

Public Relations

AMA's PR Director, Bob Lopshire, gave a verbal report describing past, current and future PR problems. Included was a description of particular problems in connection with the 1971 RC World Championships, relating to national media indifference. He then indicated various PR efforts currently underway, concerning department store model displays, the Transpo '72 Air Show at Dulles Airport in the D.C. area, during May and June; the 1972 Nationals. Worth added information concerning Transpo, the 1972 RC Masters Tournament, a possible RC Pylon Week for '73, possible assistance to the 1972 FF Championships on the west coast.

Council members then discussed a PR proposal which had been circulated by mail just prior to the meeting. The proposal was from a Washington based PR firm and offered a general PR program for a cost of about \$15-20,000 per year. The council consensus was negative, noting that what was offered were mostly promises, along with substantial expenses. No action was taken except to indicate support for continuing the current AMA PR program, based on part time PR services of Lopshire, with expenses authorized by the executive director.

Signorino requested that regular reports of AMA's PR efforts be produced both for the council and for the AMA membership. Worth noted that he and the president received brief monthly summaries and that additional copies would be made and circulated to council members. In addition he said that more detailed semi-annual reports would be produced and published to inform the membership.

Signorino and Titus suggested that AMA



The AMA Executive Council's mid-winter meeting this year was in the offices of the National Aeronautics Assn. in Washington, D.C., located adjacent to AMA HQ. AMA President John Clemens (far end of table) presided. Others shown (clockwise to Clemens' left) are John Worth, Jim Perdue, Alex Chisolm, Murry Frank, Jack Josaitis, Ron Morgan, Cliff Telford (in foreground), John Patton, Al Signorino, Josh Titus, Cliff Piper, Jim Mowrey and Earl Witt. Also attending the meeting were Bill Boss (who took this picture) and Bob Lopshire.

SEND FOR LATEST NATS INFO. There have been many rumors concerning the 1972 National Contest. At this writing it appears that the Nats will be held, either at Glenview NAS or some other location. For current OFFICIAL information, send pre-addressed, stamped envelope to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005

information be sent to news media people known to be interested in AMA activities. Worth noted that commentator Paul Harvey was such a person, and Titus provided the name of another. Big Wilson, N.Y. radio personality was also suggested. Worth said he would see that such people got the AMA publications on a regular basis.

Safety Code/Committee

Clemens noted that the previous committee chairman appointee had been inactive in recent months. Following a request for suggestions concerning a replacement, Witt volunteered to serve. His offer was accepted and it was noted that volunteers to serve on the committee would be solicited from the council and the membership.

Worth discussed recent discussions with Federal Aviation Administration (FAA) people concerning the possibility of model flying regulations being imposed as a result of unfavorable publicity involving incidents between models and full scale aircraft. He noted that the FAA was interested in the fact that AMA had a proposed safety code which could help avoid such incidents—the interest was expressed as being concerned with when such a code might be put into effect. Worth also advised that he was to meet with the FAA within a few days of the council meeting.

The status of AMA's previously proposed safety code was then reviewed, and Signorino suggested that the changes considered necessary were not great and the council could act immediately on them. Worth and Witt agreed. Clemens then led a point by point review of suggested changes. Upon completion of the review, Patton moved (seconded by Frank) that the revised version of the proposed code be adopted. Witt supported the motion, noting the need for prompt action and the fact that further revision based on experience could be made, if necessary, at anytime in the future. The motion passed unanimously.

Cars and Boats

Discussion indicated general agreement that 1971 pressure for action to provide some special arrangement to accommodate RC car and boat activity within AMA had eased. The general impression was that car activity had declined significantly since last summer. Worth also noted that R.O.A.R., the principal organization for car activity which had pressed for AMA action, had since indicated a desire to table negotiations indefinitely.

Frank then moved (seconded by Patton) that the subject of special consideration for car and boat interests be dropped in favor of simply retaining the existing insurance covering such activity by AMA members. Perdue spoke in favor of removing the insurance coverage for cars and boats, but his position was not supported and the motion passed unanimously except for his opposing vote.

Name Change

Worth showed samples of numerous examples of AMA being referred to as the American Model Association in newspapers, in mail to HQ, in invoices from business firms, in letters from organizations such as the FAA and Navy. He noted that our PR efforts are often negated by improper identity and that in at least one case it was learned that a potential sponsor had lost interest when he couldn't locate our organization because he was looking for the American Model Association.

CONTEST BOARD PROCEDURES

The revised procedures tentatively accepted by the Executive Council offer advantages over the current procedures in the major respects which follow.

1. Final vote at in-person meeting (instead of by mail as at present) which would be monitored by an AMA HQ representative for consistency.
2. Final rules voting by elected officials who are directly responsible to the membership (instead of by appointed officials as at present).
3. No distractions by National Contest or other activity (presently the only in-person Contest Board meetings are during the Nats).
4. More time for study and membership inputs prior to final vote. (Current procedures require cross-proposals to basic rules proposals by the time of CB meetings and Initial Voting during the Nats. The tentatively accepted procedures do not provide for Nats meetings or Initial Voting—allowing a longer time span for member reactions.)
5. Simpler procedures, easier to understand by AMA members (the current procedures document consists of 14 typewritten pages).
6. Better uniformity and coordination of rules actions in all categories (currently four Contest Boards acting essentially independent of one another; the tentatively accepted procedures provide for the inputs of the four category CB reps (FF, CL, RC and Scale) of each district to be funneled through a single

district officer, the elected V.P. or his delegate).

Basics of the Tentatively Accepted Procedures

1. Establish new fixed deadline for submission of rules change proposals.
 - a. Use standard form for all proposals.
 - b. Require three signatures of AMA members on proposal—one must be an active Contest Director.
2. Circulate proposals to CB's for preliminary (screening) vote.
3. Publish in the general membership magazine all proposals which pass the preliminary vote. Call for comments and cross-proposals.
4. Circulate all comments/cross-proposals.
5. District meetings of CB members to
 - a. Resolve district position.
 - b. Instruct VP for final vote.
6. Final vote meeting.
 - a. VP's or VP delegates to represent districts and their CB members.
 - b. Expenses for transportation/lodging to be paid by AMA.
 - c. President or his delegate to be chairman.

Tentative acceptance of this proposal allows time for AMA members to provide inputs to council members before final action is taken, most likely during the Executive Council Summer Meeting scheduled for the week of the 1972 National Contest, July 24-30. Any AMA member who has an interest in invited to communicate with his district vice-president (see April AAM, p. 104, for listing), with copy to AMA HQ requested also.

Signorino suggested that if American Model Association wasn't acceptable as a name it could be used, anyway, in conjunction with our existing name, as follows: by dual listing in phone books and on our letterhead. In the latter case, for example, we could show Academy of Model Aeronautics, with a second line: 'the American Model Association'. Worth agreed and explained that the main reason for considering using the name American Model Association was because it was obviously what practically everyone outside AMA used when they couldn't remember the correct name—it was a natural link between our initials and a description of our organization.

The council consensus indicated a willingness to consider linking the two names as suggested, but not in replacing one for the other. Signorino suggested the possibility of inserting the word Aircraft so as to say the American Aircraft Model Association—the initials to be AAMA. It was generally agreed to pursue the matter further by seeking membership reaction. Meanwhile, it was acknowledged that those within AMA probably favored the current name, whereas those outside the organization would probably favor the name more easily remembered.

Associate VP Representation

Witt indicated preference for geographic



Most council members came early to see AMA HQ operation. Shown L-R: Josaitis, Mowrey, Clemens, Frank, Perdue, Chisolm, Worth, Piper. Seated: Vena Pack. Bill Boss photo.

designation of AVP's, but discussion indicated that the need varied from district to district and VP's should have the freedom to make AVP appointments based on geographic and/or special interest (RC, FF, CL, etc.). It was agreed that the current allocation of up to four AVP's per AMA district was sufficient but that this could be changed if necessary by council action, if needed to solve special problems.

Witt then proposed that AVP's be permitted for Hawaii and Alaska, separate from the normal allocation of four for the districts affected (X for Hawaii, XI for Alaska). Mowrey seconded the proposal which was approved unanimously.

Contest Board Procedures

Worth explained a proposal for revised CB procedures, which was presented at the meeting as an accumulation of ideas from the HQ viewpoint. It was noted that the proposal was an attempt to simplify procedures while providing protection of membership interests, specifically by better circulation and publication of rules change proposals. It was also described as an attempt to assure rule book publication on time.

Strong council support for the proposal was evident and Piper moved that the proposal be tentatively accepted, with final approval to be considered at the July council meeting. It was noted that the proposal would not apply until 1973 and that until the July meeting suggestions for further change would be considered. Piper noted further that the Contest Board Coordinator should be designated to chair the final meeting described in the proposal. Piper's motion was then approved unanimously.

CB Safety Matters

Worth explained that the council's 1971 action to authorize the newly formed Scale Contest Board to handle all scale rules matters, including safety items, had caused

some problems. He noted that in one 1971 case the Scale Contest Board had accepted Control Line Contest Board action on the matter pertaining to safety. It was further noted that Scale Contest Board members were usually expert in only one category of Scale interest (CL, RC or FF, etc.).

Because of this, for example, a CL Scale safety problem might be voted on by a Scale board with only a few CL experts. The same situation could apply to other categories with the result that in any one category of interest it was unlikely that the Scale board would have full district representation covering that interest. On the basis, therefore, that a given category safety item should have full district representation of that particular interest, it was agreed that the previous council action should be changed.

Signorino then moved (seconded by Perdue) that the Scale Contest Board be designated to act on all scale rules matters except safety; safety matters to be handled by the appropriate category interest board(s). The motion was approved unanimously.

CL Line Tests

A proposal by Paillet, CL Contest Board chairman, requested that the council consider having an outside independent agency make tests of CL lines to determine adequate safety parameters concerning line sizes and related factors. The purpose of such tests would be to eliminate controversies which have plagued CLCB rules-making for years; such controversies resulting from wide disagreement concerning safety factors.

Council discussion indicated a consensus that only by an outside testing program could membership confidence in results be expected, since any testing by AMA people would be subject to criticism relating to conflict of interest. Worth moved (seconded by Piper) that the proposal be approved in

(Continued on page 82)

MAAC, or NAR. Entry fees are \$1.00 per event.

One reason for BMA's participation in modeling is to add encouragement and incentive for budding young aerospace engineers and scientists to develop modeling skills and experience and, thereby, learn more about the field of aeronautics and aerospace. By doing this, BMA is offering young modelers a tremendous opportunity to get involved in competition and truly to profit by the experience. We hope that all eligible modelers will take advantage of this program. For more information write to: The Boeing Management Association, P.O. Box 3707, Seattle, Washington, 98124, Attention: Ted Johnston, Organization 4-1830, Mail Stop 79-44.

1972 WORLD CHAMPIONSHIPS

World Championships team managers (appointed by AMA President John Clemens) and team members are preparing to participate in the Indoor, Scale and Control Line World Championships scheduled for this year.

The Indoor World Championships will be held in Cardington, England from August 25-28. Representing the U.S. as the Indoor Team will be: Joe Bilgri, Santa Clara, Calif.; Bud Romak, Moraga, Calif.; and Pete Andrews, Bogota, N.J. Bud Tenny, who was the Indoor Team Selection Program Administrator, will serve as team manager.

The Scale World Championships (Control Line and Radio Control events) is planned for Toulouse, France from August 2-7. Hale Wallace, a member of the U.S. team for the first Scale World Championships two years ago, is the appointed team manager. The Scale World Championships teams consist of: CONTROL LINE—Malvin E. Meador, Suitland, Md.; Ralph Burnstine, Danville, Ill.; and Mike Stott, Montezuma, Iowa; RADIO CONTROL—Maxey Hester, Montezuma, Iowa; Bob Wischer, Delafield, Wisc.; and John Roth, Smithtown, N.Y.

The Control Line World Championships (Speed, Stunt, and Team Race events) is scheduled for Helsinki, Finland, July 12-17. Dr. Laird Jackson was named to serve as team manager for the Control Line World Championships. Like Tenny, he was the Team Selection Program Administrator. The Team members for each of the Control Line events are: SPEED—Carl Dodge, Richmond Hts., Ohio; Robert Spahr, Thousand Oaks, Calif.; and Charles Schuette, Santa Monica, Calif.; STUNT—Bill Werwage, Berea, Ohio; Jerry Phelps, Woodhaven, Mich.; and Bob Gieske, Irving, Tex.; TEAM RACE—Theobald/Barr, Downey, Calif.; Dunkin/Wright, Kansas City, Mo.; and Stockton/Jehlik, Washington, D.C., alternates for Albritton/Marvin who have withdrawn.

U.S. FREE FLIGHT CHAMPS MEMORIAL DAY WEEKEND

California FF'ers will again put on the most fabulous Free Flight contest of the year—the United States Free Flight Championships. This year's version should top even last year's inaugural "happening" which drew over 600 entries from all over the U.S. and Mexico. It will be held May 27-29 at Taft, California, that fabled Mecca which all FF

BMA'S \$1500 SCHOLARSHIP CONTEST

BMA, the Boeing Management Association of the Boeing Company, is sponsoring its third annual \$1500 Model Aeronautics Scholarship Contest in an effort to encourage young people in the design, construction and flight of model airplanes and rocketry.

The contest, open to any boy or girl 18 years of age or younger, will be held June 24 and 25th at the Boeing Space Center in Kent, Washington, and features as first prize a \$1500 scholarship award good in any accredited college of the winner's choice in the United States or Canada. In addition to the scholarship award, trophies and other prizes will be awarded in 18 events.

A variety of events are scheduled for the contest, including: 1/2A Gas, Unlimited Rubber, Hand Launch Glider, Cargo, Towline Glider, Outdoor FF Helicopter, Combined Speed (record ratio), Control Line Scale

Racing, Stunt (Precision Aerobatics), Combined Navy Carrier (record ratio), Combat, Dive Bombing and Strafing, Indoor HL Glider, Indoor Easy "B", Rocket Class "O" Altitude, Rocket Swift Boost Glide, Radio Control Aerobatics and Design Craftsmanship.

The Boeing Space Center contest site provides nearly 100 acres of flat grassy land, including a well manicured Radio Control runway. Control Line events, with the exception of Combat, will be held on the asphalt parking lot of the Space Center, and Indoor events will take place in a nearby school gymnasium.

Solo teenage travelers who are participating in the contest will be the guests of the BMA which will provide, at no cost to the contestant, a home away from home during the contest weekend.

In addition to the tremendous opportunities for young modelers, an Open Class Contest will run on June 25 concurrently with the Scholarship Contest. Events scheduled for the Open Contest are: 1/2A FF Gas, A1 and A2 Towline Glider, HL Glider, Control Line Stunt, Combined Speed (record ratio), Control Line Scale Racing, Combat, and Radio Control Class "C" Pattern.

Both the Scholarship Contest and Open Class Contest are AMA sanctioned and participation is restricted to members of the AMA,

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flyers deserve to fly on at some point in their modeling careers.

The original aim in putting on this contest was to fill the void created by the recent fixed location of the National Contest. But last year's success instantly established the U.S. FF Championships as an institution in itself, and not a substitute for anything!

This contest offers the serious competitor the chance to prove himself against the best flyers to be found anywhere in the country—under ideal weather and field conditions. It also allows the more “sociable” type flyer a chance to gather with a most congenial group and compete in a relaxed, “let the good times roll” atmosphere. In short, the U.S. FF Champs is a large FF contest like it should be—true championships atmosphere without the usual limitations posed by large contests in built-up areas.

All the normal FF competition categories will be flown, plus some special events, such as Night Flying and Class D Gas (for .41 to .65 engines) which are specialties peculiar to the west coast. A complete selection of FF Old-Timer events will also be available. Trophies will be awarded through fifth place in all events except Old Timer and Class D, plus sweepstakes trophies for Junior, Senior and Open age groups. The Grand Championship Trophy (donated by Kyosho Corp.) stands over seven feet tall!

A new Team Championship Award will be presented this year. Three-man teams compete for this award, flying seven separate events between them.

The 1971 FF Championships drew contestants from all over the country—from as far away as Connecticut. This year it is expected that even more out-of-staters will take advantage of the opportunity to combine their hobby with a California vacation.

For further information, contact Contest Director Al Vela, 11807 Crystal, Chino, California 91717.

Chartered Club officers who receive the AMA Monthly Mailing found out in April what was April's big modeling news. Did you? If not, ask your officers why not!

Cloudbusters Annual Scale Meet

Scale modeling is a fascinating subject, be it RC, CL, FF, or Indoor. The builders have spent anywhere from tens to hundreds of hours in research, building and finishing. Then comes the moment of truth: will it fly? Here the time span is exceptionally short, all too frequently only a matter of seconds. But if the model was balanced and pre-trimmed as delicately as it was constructed and finished, chances are that the aircraft will enjoy many flights, a delight to its builder and to all who view it.

The report which follows is about an AMA sanctioned Free Flight Flying Scale Contest which was organized by the Cloudbusters Model Airplane Club at Southfield, Michigan. AMA contest Directors were Ralph Kuenz (AMA 22462) and George Lewis (AMA 27710).

Presaged by several days of inclement weather, Sunday October 20 dawned with the promise of sunshine. And lo! “Hung”, the great god of thermals, smiled down on a small but active part of modeldom known as the “Cloudbusters” and swept away the overcast with a gentle wind so that this day's flying might beautifully happen.

And happen it did: another successful Annual Scale Meet. A rainbow array of color and sound from the military drab of WW I to the flashy civvy jobs, from the shrill laughter of an .02 engine to the low-throated rumble of the scale judges.

This year four events were flown: Free Flight Gas Scale, Outdoor Rubber Scale, Peanut Scale and WW I Scale. These events provided a variety in the flying and building requirements and offered a change of pace in the day's activities—with the emphasis on fun.

At this contest the Outdoor Rubber Scale Event was flight-judged by means of the new (1972) Indoor Scale Rules which provide for awarding points at the rate of one per second of flight—but limited to the number of static scale points each entry is awarded. This variation on standard AMA rules was published well in advance of the contest, and as it turned out it was the most hotly contested of

the four scheduled, with only one flyer able to exceed his static score by getting a better flight score, and this was because of a relatively low static score. Meanwhile, every other flyer was busy trying to get a better match of flight and static points. Many improved their positions, but only the one previously mentioned was able to get a perfect match.

Ralph Kuenz (AMA 22462) was the eventual winner with a Folkerts SK-2 which achieved a static score of 74.5 and flight score of 60. The two runners-up, a Citabria and a PSL-24, each had higher static scores but shorter flights. Comments by the entrants on use of these rules were favorable, most agreeing that they provide an incentive to build a good Scale model that flies well.

Entries in the Free Flight Gas Scale Event varied from an ultra-light American Eaglet to a B-70. Charles Schobloher (AMA 11053) entered a twin engine Grumman Widgeon amphibian, but a balky right engine prevented a qualifying flight. Indicative of the fantastic model that it is, Many MacIsaac's American Eaglet won the event with a 470-pt. total. This compares with 196 points for second (Stinson 0-49) and 159 points for third (B-70).

Peanut Scale—it's hard to describe these little critters that belie their diminutive size by flying as well as the bigger rubber-powered planes. It seems the answer to building a good performing Peanut Scale model is to build a racer. These have small wings but fly well. Al Koehler (AMA 59467) won the event with a Bonzo, while a Cougar and a Folkerts placed second and third.

WW I Scale is a fun event that involves no scale judging other than verifying that the model is of this type and with .02 power. This event was for endurance only, with engine run divided into total flight time for the best ratio, a minimum 10-second engine run being imposed. Eindeckers, Spads and Dehavilands were hard put to beat the SE-5 entered by Clarence Wentzel (AMA 8865).

The contest was a lot fun for the Cloudbusters and the entrants—a great combination. The club is planning to do it again this year.



Left: Ken Johnson, best known for model ornithopters, gets off a flight in the Cloudbusters' Meet with a 30" Waterman Gosling Racer. It's rubber-powered. Above: Here's the model which took first in the WW I event—SE-5 by Clarence Wentzel. Right: Young Scott Ramsey did real well with his B-70 Valkyrie gas-powered model.



AMA News Bits

1972 Rule Books

AMA members who renewed (or joined for the first time) in late 1971 or in early 1972 should have the 1972 Model Aircraft Regulations (rule book) in their hands by this time. Following late finalization by the Contest Boards of some of the material applicable to 1972, the rule book was rushed to the printer so that a mass mailing to AMA members could be made in early March.

As an aid in telling which rules have been changed for 1972 (basic information published in the "AMA News Extra" sections in February and March), each new or revised paragraph is identified by an adjacent dot. This idea, the brainchild of RC Contest Board Chairman Bill Northrop, was first used in 1971. Members are cautioned to read chapters of interest in their entirety, however, as any error in placement of the dots cannot be considered a valid basis for not complying with the rule.

1973 RULE BOOKS. Currently, and all during 1972, there is a "freeze" on the rules-revision process to provide the Contest Boards with time to review and revise the 1972 rules in the areas of format, sequence, language, etc. The goal is to produce an upgraded 1973 rule book with such revisions as are needed to make the rules easier to understand and apply. Changes in specifics and/or meaning are not authorized—so that the 1973 rules should be essentially the same as 1972, but clarified in wording.

California/Hawaii Challenge

That imaginative AMA chartered RC club known as the B.I.R.D.S. of Carson, Calif., (did you know that the initials stand for Beginners in Radio Drones?) have joined with United Air Lines in sponsoring a jet charter

flight to Hawaii which includes a challenge competition with the Hawaii RC Club in six events: A Pattern, B Pattern, C Pattern Novice, C Pattern Expert, Formula I Pylon and Sport Pylon.

The trip is planned for June 24 through July 1. For just \$255 per person the tour includes the round trip jet flights via United, eight days and seven nights at the Ala Moana Hotel in Waikiki, airport transfers and baggage tipping at airport and hotel, traditional flower lei greeting on arrival, briefing party with Hawaiian entertainment, Pearl Harbor cruise, services of a professional Hawaiian Holidays escort, and transportation of one airplane box.

At last report the RC flying aspect was slated to encompass one day for practice and four days of competition, ending with a luau on Friday night. This will take place at an old Air Force Base (Bellows) which is a half hour's drive from Honolulu.

The word we have is that members of other clubs may take advantage of the trip if they wish. Problem is that the deadline for booking (May 20) will have passed by the time this issue is distributed, but if you are interested in participating it may be worthwhile (if the charter is not fully booked) to immediately contact: California Hawaii Summer Fun Fly, Joe Bridi, c/o Hawaiian Holidays, Inc., 1721 N. Highland Ave. Suite H, Hollywood, Calif. 90028.

New Dist. IX CLCB Member

District IX V.P. Stan Chilton has appointed Michael C. Tallman (3014 Exchange, Wichita, Kans. 67217) as District IX Control Line Contest Board member for 1972. Note that this is a change in the officer directory as published in the April AAM, page 104.



Robert D. Reed of Rosamond, Calif. is the current holder of the FAI RC Seaplane Distance World Record, having made a flight of 5 hours, 9 minutes and 6 seconds on January 29. The record was set with the OS 40-powered Queenie Too model shown, but modified since photo was taken by having only one external tank behind engine (instead of three) and two internal tanks. The record previously was held by Russia. Later, on February 26, Reed made a distance flight of 83.1 miles. Bettering the 63-mile Russian mark, this has been submitted to the FAI as a tentative World Record. Queenie Too was designed by Reed as a sport model.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

MAY 6-7—BURLINGTON, N.C. (AA) Third Annual Greensboro RC Contest. Site: Old Fairchild Airport. H. Randles CD, Rt. 1, Box 484 S, Burlington, N.C. 27215. Sponsor: Greensboro Radio Modelers.

MAY 6-7—HUNTSVILLE, ALA (AA) 12th Annual Rocket City RC Meet. Site: Huntsville Heliport. C. Scholefield CD, 2709 Briarwood Dr., Huntsville, Ala. 35801.

MAY 6-7—HILLSBORO, ORE. (A) Nor'Westers May FF Contest. Site: Hillsboro. D. Sobala CD, 1720 NW 138th, Portland, Ore. 97229. Sponsor: Nor'Westers.

MAY 6-7—MESQUITE, TEX. (AA) Dallas RC Club Annual Pattern Meet. Site: Samuels East Park. R. Straw CD, 506 Salem Dr., Richardson, Tex. 75080. Sponsor: Dallas Radio Control Club.

MAY 6-7—WOODLAND, CALIF. (AA) West Coast Invitational 2nd Annual RC Stunt Meet. Site: County Airport. R. Knowles CD, 255 Berryessa Dr., Vacaville, Calif. 95688. Sponsor: Woodland RC Club & Vaca Valley Radio Controllers.

MAY 7—COUNCIL BLUFFS, IOWA (AA) Mid-Western Spring CL Warm-Up. Site: Iowa School for the Deaf. H. Hough CD, 924 Avenue I, Council Bluffs, Iowa 51501. Sponsor: Council Bluffs Balsa Busters.

MAY 7—LOS ANGELES, CALIF. (A) CL Racing Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. 1, Alhambra, Calif. 91801.

MAY 7—VA. BEACH, VA. (A) Tidewater Model Soaring Society/ECSS Thermal RC Event. Site: Fentress Airfield. R. Crane CD, 5356 Coachway Dr., Norfolk, Va. 23502. Sponsor: Tidewater Model Soaring Society.

MAY 7—FRANKTON, IND. (A) Madison County RC Flyers Fun Fly. Site: Club Field. D. Huffman CD, RR No. 3, Box 350 B, Elwood, Ind. 46036. Sponsor: Madison County RC Flyers.

MAY 7—W. LAFAYETTE, IND. (A) Cosmic Combat CL Championships. Site: Purdue University. R. Ryon CD, 4006 Pippin, Lafayette, Ind. 47901.

MAY 7—EAST MEADOW, N.Y. (AA) LIAMAC/A & S Aeromodeling CL Championships. Site: Eisenhower Park. J. Pallet CD, 30 Emerson Rd., Brookville, L.I., N.Y. 11545.

MAY 7—HADLEY, MASS. (AA) Hampshire Showdown RC Air Races. Site: H.C.R.C. Field. J. Papageorge CD, 104 Rocky Hill Rd., Hadley, Mass. 01035. Sponsor: Hampshire County Radio Controllers.

MAY 7—WICHITA, KANS. (AA) Wichihawks 5th Annual Spring FF (Cat. II) & CL Rally. Site: 13th and Webb Rds. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: Wichihawks Model Airplane Club.

MAY 7—ST. LOUIS, MO. Signal Chasers Fly-for-Fun Meet. Site: Buder Park. M. Hart CD, 936 Dontaos, St. Louis, Mo. 63131. Sponsor: Signal Chasers RC Club.

MAY 7—SACRAMENTO, CALIF. (AA) Northern Calif. FF Council Meet (Cat. I). Site: Sacramento. S. Geraghty CD, 2858 Pinecrest Ct., San Jose, Calif. 95121. Sponsor: Oakland Cloud Dusters.

MAY 13-14—JACKSON, MISS. (AA) 8th Annual Mississippi RC Model Airplane Championships. Site: Capitol City RC Field. B. Payne CD, 378 Naples Rd., Jackson, Miss. Sponsor: Capitol City RC Club.

MAY 13-14—JACKSONVILLE, FLA (AAA) FF, CL & RC Rebel Rally. Site: Whitehouse Field. H. Pierce, Jr. CD, 3610 River Hall Dr., Jacksonville, Fla. 32217.

MAY 13-14—TULSA, OKLA. (AA) Tulsa Glue Dobbers Spring FF (Cat. II) & CL Rally. Site: Glue Dobbers Field. L. Hott CD, 4311 S. Canton, Tulsa, Okla. 74135. Sponsor: Tulsa Glue Dobbers.

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AMA OFFICER DIRECTORY

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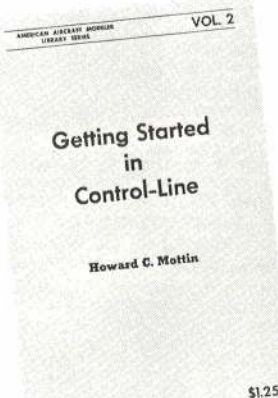
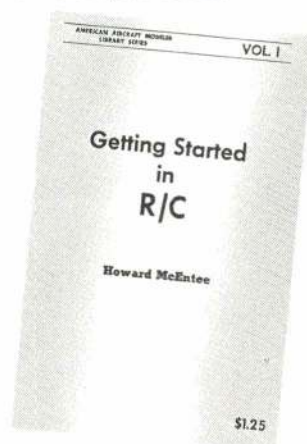
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